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THE
CHEMICAL TRADE
JOURNAL:

A WEEKLY NEWSPAPER DEVOTED TO

The Commercial Aspect of the Chemical and Allied Industries.

EDITED BY

GEORGE E. DAVIS,

FORMERLY ONE OF HER MAJESTY'S INSPECTORS OF ALKALI WORKS
CHEMICAL ENGINEER AND CONSULTING CHEMIST.

VOLUME VI.

[JANUARY TO JUNE, 1890.]

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THE CHEMICAL AND ALLIED TRADES IN 1889.

"Was I deceived or did a sable cloud
Turn forth her silver lining on the night."—Milton.

THE dark cloud has for a long time past overshadowed many branches of the chemical trade. Increased competition, a continual lowering of prices, and in some instances a diminished consumption, have all combined to make the chemical manufacturer's life an uneasy one. Many, if not most, of the difficulties that have arisen may be traced directly to the commercial surroundings of the undertaking, as a manufacturer can only consider his business successful or non-successful according to whether his revenue exceeds his expenditure or *vice-versa*. It will thus be seen that even with chemical operations in *statu quo*, the various alternations in price, either of raw materials or finished products, will banish certain processes from the arena of practicability, or bring up others that have been devised before their time. The present year has seen all of these things in degrees of greater or lesser magnitude, and perhaps

THE ALKALI TRADE

is one that has had a keener watch set upon it than most other branches of industry. The year will be remembered as being the breaking up of all conventions regulating the sales of alkali products; hydrochloric acid, bleach, chlorate caustic, and ash: all the paper bonds of union have been scattered to the four winds of heaven, and each manufacturer is now free to make and sell just as much as he pleases. It is difficult to say at this early date what will be the effect of abrogating the many conventions that have of late existed in the alkali trade, but the immediate result has been to cause a fall in bleach values of considerable amount, for while at this time last year the price of this commodity was £7. 7s. 6d. per ton, it has now fallen to £5. and even less is whispered.

There is no doubt the introduction of sulphite wood pulp into papermaking has had a considerable effect upon the alkali trade, as very fair paper, useful for a large number of purposes, can be made without the intervention of a particle of either caustic soda or bleaching powder, and the use and manufacture of sulphite pulp is extending.

The anxious times passed through by the Leblanc makers have served to stimulate them to an extraordinary degree. It is true they have not yet learned the lesson of the folly of making low strength ash and caustic, giving casks and salt to the consumer, who, nevertheless, has to pay the carriage upon it, but no doubt the time will come when but little else than 70 per cent. will be made by the Leblanc process.

In most processes the gradual expansion of prices for raw material has necessitated the strictest economy in all operations connected therewith, and whereas 55 to 60 cwts. of salt were required twelve years ago to make a ton of "bleach" by the Weldon process, it is now being made from 42 cwts., a number, we feel sure, cannot be reduced by the said process without material modification. At the same

time the Deacon process has been so improved, that a ton of bleach is now being made from a little more than a ton of salt, a quantity yet leaving room for improvement.

Alkali values have improved somewhat, and we hope this is to be a permanent feature of the trade; refined 48% ash having risen during the year from £4. 17s. 6d. to £5. 5s., and 70% caustic soda from £7. to £7. 5s., 60's caustic having also advanced 5s.

Coal and salt, two very important raw materials, have advanced in price, 4s. 6d. slack has risen to about 8s., and salt from 5s. 9d. to 10s., hard facts that will no doubt tend to the observance of stricter economy.

But by far the most notable event in the alkali trade during the current year has been the setting to work of the Chance-Claus sulphur recovery process, which is now working successfully in several places, so far as the operations themselves are concerned. The plant is, however, costly, though easy to manipulate, and to our minds the future of the process taken as a whole is a little bit uncertain. In fact it has already been discovered that even with the best arranged plant, sulphur, as sulphuretted hydrogen from vat-waste, cannot compete in cost with the sulphur from Spanish pyrites, and that in order to secure success, sulphur must be the marketable product. But again there lies a stumbling block in the way, far greater than any other with which the commercial departments of the alkali works have ever had to deal. Invention succeeds invention, the new displaces the old, and the great market for "flowers" or flour of sulphur—the gun-powder manufacture—is slowly but surely becoming closed. The new powders, and especially the picric compounds, are attaining such a degree of perfection as to have sooner or later a most decided effect upon the flour of sulphur trade. In fact, we may say the reaction has now set in and those Leblanc makers producing flour of sulphur have already discovered it is no easy task to sell their product. One works in which the process has been recently started, is endeavouring to secure the maximum quantity of "roll" sulphur and the minimum of "flour," but whether this will aid them in the long run remains to be seen.

The ammonia soda works still continue in the even tenour of their way. What the Cheshire Alkali Co. are doing we are unable to say, but a third works of this character have now placed a high-class quality of ammonia-soda in the market. After many trials and tribulations, Messrs. Mathieson and Co. have so far completed their work as to offer considerable quantities for sale. Messrs. Brunner, Mond, and Co. have again paid substantial dividends to their shareholders, and though they seem no nearer the solution of the problem as regards the manufacture of bleaching powder, yet they have, it is rumoured, succeeded in getting more latent value from their fuel than any other firm has yet been able to accomplish.

Intimately connected with the chemical trade, bound up with it by ties of no common order, is the

PAPER MANUFACTURE,

which is one of the first to feel any improvement in the general condition of trade, the consumption of paper being so widely distributed over the civilised world.

This has just been the case during the year that has just passed away. Paper makers have been busy, and in many cases extensive alterations and additions to existing plant have been made to meet the growing requirements of the demands of the market, and to keep pace with the ceaseless tide of invention which seems to flood every industry. It is confidently expected that the healthy tone which pervades the trade at the present time will continue during the next 12 months, if it does not materially improve.

The paper trade has not escaped the syndicate fever which has attacked every description of business enterprise—for we have witnessed the total collapse of the projected "News Syndicate," and the successful conversion of large publishing and stationery firms into limited companies. The development of wood-pulp manufacture in this country during the year, has taken place to a greater extent than in any previous year, and manufacturers of paper are becoming more acquainted with the qualities and capabilities of the different pulps manufactured for the most part in Norway

and Sweden and in Germany, and have now fully recognised the vast influence which these fibres will have upon the industry. Several of the largest pulp manufacturing concerns have been successfully floated with British capital, and in notable instances the operations of these companies will be carried out in England. The Kellner Partington Co., at Barrow, the Hull Co., at Hull, and the very recently projected company at the same place—a reference to which we had in our last but one issue—have for their object the manufacture of wood pulp by what is known as the bisulphite process, and the eagerness with which the public subscribed towards the formation of them is a sure indication of the further development of this industry in our midst. We hear further that the large installation of Dahl's system for the preparation of wood-pulp by what is known as the "Sulphate process" is being adopted by Messrs. Dickinson, of Croxley Mills; and that the Inverkeithing Co., on the shores of the Firth of Forth, has decided to extend its pulp manufacture by the old caustic soda process, first introduced into this country by Lee and Houghton, beyond the mere experimental output of the present year. But the extension of these manufactures has been carried out on a much wider scale in America, Germany, Austria, Norway and Sweden, than at home. These countries possess abundant supplies of timber suitable for pulp manufacture, and thus are supposed to have advantages which are wanting in England. All these countries have received extensive additions to their wood-pulp producing powers.

Owing to the collapse of the Bleach Association the value of Bleaching Powder has materially decreased, giving a specific advantage to the paper maker in the cost of bleaching the various raw fibres which he uses, whilst the action of the Salt Union in raising the price of chemical salt, and the influence of the increasing cost of fuel upon Leblanc soda makers have had a tendency to increase the cost of alkalis. What, therefore, may be saved by the diminishing value of bleach, will only neutralize the increased cost of the alkali, and the outlook in the immediate future for the further development and introduction of electrolytic methods of bleaching seems somewhat gloomy. The promoters of the electrolytic methods of bleaching have been somewhat silent during the year, probably owing to the fact that rival processes are said to exist, and the instability of the future cost of bleaching powder is very apparent. It was confidently hoped that the present year would see the thorough development of M. Hermite's process, but with the exception of a little information of questionable value, nothing has been said with respect to the advantages, first, as a practical process, and second, as a question of economy, which this invention offers, nor, indeed, that its success in either of these respects has been assured.

The year 1889 has not been marked by the introduction of any new invention of a revolutionary tendency, but rather by the steady introduction of improvements on existing machinery, and by the more extended use of processes already widely known, and which are being more highly appreciated as factors in the advancement of the times. There have, also, been plain indications that old rule of thumb methods of manufacture are now looked upon with uncertainty, and that technical education of a high class is necessary to understand the nature and possibilities of the numerous inventions which flood the market, and to successfully introduce them into our paper mills.

Perhaps next in interest, and also, we may say, in importance, is the

SCOTTISH MINERAL OIL INDUSTRY,

which to-day looks back on a year of steady, though not very swift, recuperation from the serious exhaustion of the foregoing season. The various companies—formerly destructively at war with each other—were found to work wonderfully well in combination, much better than the most hopeful had expected, and although some little jostling and individual interests now and again cropped up, there had arisen nothing of very grave import in that connection. The remembrance of the general peril of 1887 was still fresh, and mutual forbearance in the last resort continued a ruling influence. The Mineral Oil Association, which may be regarded as a select committee of the whole industry with executive powers,

had firmly taken in hand the price and market position of burning oil, together with the rate of production (restricted) apportioned to each of the makers; and the same authority, in conjunction with the Standard Oil Co. of America, had also assumed the regulation in like manner, of paraffin scale and paraffin wax. The other varieties of the paraffin manufacture, namely, lubricating oils, naphtha and sulphate of ammonia, were meanwhile left to find their natural levels in the general market. In January, 1889, the paraffin scale and wax agreement fell in for renewal, a representative of the American producers attending the meeting held in London for that purpose. The Oakbank Oil Co. at first intimated its disinclination to become a party for another year, and the outlook for a little seemed risky; but, finally, objections were removed so far, and the compact entered its second term with the original members intact and a few private paraffin-candle making firms added. On that occasion the values of scale and wax, and of the paraffin-candles manufactured therefrom, were left as originally fixed, although some members strongly advocated a slight advance. These, therefore, stood at 2d. and 2½d. per lb. for scale, soft and hard respectively; 2½d. for w^{ax} 120° semi-refined; and 4d. less 5 per cent. as the standard for household candles supplied to retail dealers, while burning oil by agreement was parted with, to Scotch buyers, at not less than 5½d. to 6d. a gallon, according to quality. A heavy penalty is by mutual agreement attached to infringement of this rule, but it has to be observed that makers are at liberty to sell to *bona-fide* English, Irish, or foreign consumers at what they can get and choose to accept. In February proposals were seriously advanced by an association of financiers in London to buy up every going Mineral Oil Company in Scotland, in order to carry on the industry as one single close concern; but although the project agitated the various managements for several weeks, due reconciliation of individual interests promised to prove too huge an undertaking, and it faded out of the sphere of practical finance without result. The different concerns were holding surprisingly well together under the direction of the Association, and in short time was inopportune. Had the offer come, in almost any shape during the dismal months of 1887, it would have been snapped at greedily, but the rage was for selling out of "oil" then, and for a time no one thought of buying in. At the annual balancing time this year—April and May—the dividends announced from week to week gave indication of a vastly improved general condition. Be it noted that in 1888, when these great refining companies were doing no more than pulling off from the brink of collapse, there were no dividends of any account. That is, the Broxburn Oil Company, which for years had paid 25 per cent, managed with difficulty to provide for 5; a second company paid 3, and all the others were blanks—some of them worse, for there were considerable losses to declare. This year the show was much more favourable. The Broxburn Company came up with 15 per cent; the Hermand (crude oil only, crude works have not been subject to the same vicissitudes), 17½; the Pumpherton, 10; the Oakbank, 8; Young's Paraffin Company, 7½; the Clippens, 5; and the Holmes, 4. The Burntisland Oil Company had nothing to divide, but that was due to exceptional causes, well understood and previously discounted. The Burntisland works had just engaged in the manufacture of candles at a heavy outlay for plant, and their brands, being as yet new and unknown, had to a large extent accumulated on the market unplaced. During the season now running, the opportunities of this concern for disposing of its candle produce should be much more favourable. The Linlithgow Company has been unfortunate from the beginning of its career four years ago, owing to the shale field to which it is tied not having come up in productiveness to the representations of the vendors, and, as yet, there has been no return to the shareholders, although the concern in its working details has confessedly been well managed. The West Lothian Company made a small profit, but not sufficient for dividend, and the shareholders had, therefore, to repeat the disappointment of the two foregoing years. Prospects as regards this company are not, however, by any means destitute of encouragement. There has been much trouble with retorts, which is now amended at considerable outlay,

and a fine new field of shale contiguous to the works has just been opened out, so that with decent values ruling in the products market, the balance of next year ought to leave something for division. A very uncertain factor in the lot of these shale oil works in Scotland is the attitude of the shale miners employed, of whom there are several thousands at work when the industry is in full blast. A strike in 1887 inflicted a disastrous injury, irrespective of the loss in wages to the strikers themselves, the latter variously estimated from £50,000., upwards. The strikers were worsted, and since returning to work, better values being had for most of the paraffin products, wages have been increased without pressure applied. The men, or their agents for them, have been clamouring in a small way for a further rise and holding out threats; but prices really do not permit of that, and were the miners so mad as to come out in force again, as in 1887, nothing but general disaster could be the result. The fact is, that towards the close of the year the position of burning oil (the chief product, and that on which dividend prospects depend) became less satisfactory, owing partly to the phenomenal mildness of the winter, and the Association prices (raised in July to 6½d. to 6¾d. at the works), were maintained with some difficulty. Just at the close, the gas workers' agitation in England has somewhat stimulated the demand for Scotch burning oil, and also for the improved oil lamps which one or two of the Paraffin companies manufacture; but this is mainly a transient influence, although it is certainly true that some householders, after being thus compelled to try oil *versus* coal gas, are delighted with the perfected results of the former, and disposed to stick to it as a permanency. During the year one new works has been added to the list, or rather, it should be said, one of the old shipwrecked concerns has been revived, in new hands and under more hopeful auspices. This is the Caledonian Oil Company, the shalefields and refinery works acquired by them being those of the old Lanark Company, which went down a few years ago when the oil outlook in Scotland first began to be an anxious one, and prices were unremunerative. The proprietors, that is to say the shareholding body, are chiefly of London, where the head office at present is, and the place also of the statutory meetings. The direction of the works is in the hands of Mr. Sutherland of Bathgate, formerly the managing director of the West Lothian Oil Company, and Mr. A. C. Thomson, late of the Pumpherton Company, has been acting as chemical engineer and consulting chemist. The oils and solid paraffins of this new works are expected to be ready for offer to consumers early in 1890. The Hermand Oil Company, of Mid Lothian, till now confined to the production of crude oil, resolved at its annual meeting in May to begin refining, and at an early date to consider the advisability of starting candle-making, also for these purposes £60,000. of additional capital has been called for from original shareholders and new investors, and this, it is believed, has been coming in to fair satisfaction under the circumstances. These represent the only additions of the year to the bulk of the paraffin industry in Scotland, and the old concerns are all in life and all likely to live, although one or two have still formidable difficulties to contend with. They form a section of their own on the Exchange, and speculative buying and selling go on more or less actively from year's end to year's end. The stock market is "torpedoed" (to use an American oil-well technicality) from time to time by speculative operators with sometimes surprising results. During September, quotations took a big jump under a report that both America and Russia, as oil producers, were falling behind in available stocks, but the reactive drop in November more than discounted September's rise, on the impression regaining footing that both these foreign fields still possessed abundant supplies.

These Oil Companies of Scotland number 15 in all, excluding one or two private affairs of quite small compass. The capital involved amounts, roughly speaking, to two and a half millions, of which Young's Paraffin Co., which is the largest as an aggregate investment, appropriates nearly £600,000. The Broxburn Co. comes next with its £335,000, followed closely by the Burntisland and Clippens Companies. The Linlithgow also is heavily weighted with capital, and the next in order of amount is the Pumpherton Co. with £130,000. The

smallest is the Dalmeny Co. with £27,000, a concern of handsome dividends throughout, but confined to the production of crude oil only, and so liable to fewer risks. Four of the companies are fully paid up; the rest are for the most part called to within one-fifth.

Passing from the Mineral Oil Companies, we turn our attention to the processes of

TAR DISTILLING AND REFINING.

in which industries, however, there is nothing revolutionary to chronicle. It is the outside of this industry that affects the inside, and tar distillers as a rule have to go plodding on, and accept as the result of their labours whatever prices the dealers may see fit to offer them. Benzol has kept a remarkably steady value during the whole year, as 90's came in at 3s. 2d., and went out at 3s. 5d., while 50/90's entered the year at 2s. 6d., and found 2s. 7d. at the end of December. Carbo-lic Acid (crude) and Anthracene have declined, but the latter is now very firm; in fact, with an exception here and there, all tar products have become enhanced in value, to the sole gain, in many instances, of the gas works situated in positions populated with keen competitors.

Taking all in all, tar distillers as a rule cannot look back with regret upon the year 1889, after having passed through years such as '85, since which date there is scarcely a product that has not doubled itself in value, and several become trebled and quadrupled. Yet the conditions are practically the same as before. There is more tar undergoing distillation now than in 1885, and though the yield of benzol from tar may be less, there is much more carbonization benzol in the market than there was four years ago.

During the year there have been considerable developments in the use of certain bye-products of the coal tar industry; creosote is now very largely employed for purposes of illumination in large open spaces, and the "Wells" light is perhaps the most portable and useful form of apparatus, as the oil is converted into vapour before combustion, and hence there is no spray of oil thrown about as with most other lamps. This outlet for creosote (cooled and filtered) is one which all tar-distillers should foster as, if the price is not inordinately raised, there should be a steady business passing for many years to come, that is, of course, supposing the tar distillation industry continues to exist. But there is no doubt that the longevity of this industry is contingent upon the non-success of the "Dinsmore process," which we have noticed in another column, and it is most probable that tar distillers of the keener perception are watching that process with more than ordinary interest. It was at one time thought that a big fillip would be given to the pyridine industry, as an agent for odorizing "water-gas," but as this gas is now under a cloud, these expectations are not being realised. Neither as a medium for "denaturing" spirit has much pyridine been required.

The year has not been marked with any invention or discovery of note, unless we mention the introduction of synthetical carbo-lic acid by the Badische Anilin und Soda Fabrik. The tar distillation industry is too uncertain as regards its supply of raw material for manufacturers to expend much capital in experimental plant, or to trouble themselves in developing business which might not be theirs to-morrow. It is strange, yet interesting, how one industry may beget another, and the new one grow into immense importance. Such has been the case, however, with

THE GAS INDUSTRY.

which is a manufacturing operation requiring for its full technical development the highest scientific knowledge and skill, both in engineering and chemistry. Twenty years ago this was not recognised, but it is pleasing to observe that in all works of standing the chemistry of the process is to-day receiving due attention. Gas managers have of late turned their attention more deeply to the working up, on the premises, of their residual products, this having, in a great measure, been brought about by the action of the railway companies. We have already called attention to many anomalous rates and charges, but there has never been anything more iniquitous than the charges for carriage of ammoniacal liquor, which have been extracted from the pockets of the gas companies,

until it has well nigh extinguished the carrying trade of gas water, the gas works being compelled to work up the liquor themselves, in order to escape the fearful tax imposed upon them, often double the value of the substance carried.

In the sulphate of ammonia manufacture the old form of still is becoming a *rara avis*, and no one with any knowledge would even keep them working if they possessed them. The column still using 7 cwt. of fuel per ton of sulphate when worked with 5° Tw. liquor (ten ounce) is the one that is now being used almost universally, and of which there are several patterns to choose from. In this connection, especially when the gas liquor made in the works is used up therein, it is surprising that no serious attempt should be made to reduce the water used in scrubbing, so strengthening the liquor, say to 16 or 18 ounce, and avoiding the inevitable loss of illuminants by excessive water. If 18 ounce liquor were used with a column still of the most approved construction, the fuel consumption should be brought down to 4 cwts. per ton of sulphate.

During the past year, which has not been an uneventful one for several gas undertakings, we have published in our columns "A Study of Coal Gas," being the results of a research emanating from the laboratories of the Paris Gas Co. These experiments deserve the careful consideration of the Board of Management of every gas undertaking in the United Kingdom, showing as they do the necessity of a careful study of the subject of gas-making and the highly technical character of the various operations.

Those responsible for the due carrying on of the gas industry have noticed perhaps the steady progress made by practical electricity, and though we may be some distance from the time when gas will be superseded for purposes of illumination, yet the recent strikes have taught the lesson how uncertain the gas supply of the future may be, and how much may be done with paraffin oil better and at less cost than gas. These are lessons which, if not learned, had better not have been read us at all; who can say that he has profited by them?

In the

ANILINE COLOUR TRADE

there is not much to report in the scientific department, nevertheless the outlook of the industry in England looks very hopeful. In the latter months of the year, the old established colour works of Messrs. Dan Dawson Bros. was converted into a Limited Liability Company, and is, we understand, to be carried on with renewed vigour. The works are well situated and well stocked, both with chemical and colour plant, for the manufacture of Magenta, Blue, Saffranine, Naphthalamine, Bismarck Brown, Chrysoidine, and the Naphthalene colours. When it is remembered that the German colour makers alone export goods to the value of over £5,000,000 per annum, it does seem strange that no great effort has been made to increase the make at home. But perchance the tide which has for so many years been running in one direction, will soon be restored into its old channels, and perhaps we may be the first to announce that the well-known colour firm of Mr. Ivan Levinstein has been converted into a private limited company, with a capital of £150,000, of which the partners are two of the most important German companies, viz., the Actiengesellschaft für Anilin Fabrikation, in Berlin, and the Farbwerke, vormals, Friedrich Bayer and Cie, of Elberfeld, who will, with Mr. Levinstein himself, trade as I. Levinstein and Co., Limited. Mr. Ivan Levinstein will be the managing director. It is, we believe, the intention to very considerably extend and enlarge the Crumpsall Vale Chemical Works, and there is no doubt that the new enterprise will give a greater impetus to a re-transfer of the coal tar colour industry to England than all the clamour for Technical Education.

Another trade that has aroused from lethargy, having been awakened, as is usually the case, from the outside, is the

WOOLLEN INDUSTRY.

especially that branch devoted to the scouring of the raw wool. Fortunes in the bye-products from certain operations have been sent down the Aire and Calder simply for the want of a little enterprise on the part of the manufacturer, a little

technical knowledge, and the calling in of an expert to assist. But the past year has seen several attempts to treat the question in a systematic manner; the potash, the ammonia, and the wool-grease are all subjects to which the woollen manufacturer has turned his attention, and in several instances this has been done, but it is yet too early to expect matured results.

The principle of multiple evaporation has been applied in one large mill in Yorkshire, where an immense quantity of polluted water used formerly to be turned into the adjoining river.

During the past year the Mayors of Bradford and Leeds have met in formal conference to consider the best means to be taken to prevent the pollution of the rivers Aire and Calder, chiefly polluted by woollen mills and their allied trades, so that it would be well for others in a similar line of business to keep themselves posted up in what is being done in Yorkshire.

The benzine and bisulphide of carbon processes for cleansing raw wool have both been undergoing gradual and certain development, and as these methods may possibly be employed in the wool producing countries, some change in the industrial situation may before long take place, and it is quite within the bounds of possibility that instead of receiving raw wool as heretofore from the wool producing centres, we may at no distant future import a degreased and partly purified material, thus saving carriage and freight, and helping at the same time towards the solution of our river pollution difficulty.

We are pleased to report that the Yorkshire College at Leeds has aided in a very material manner the scientific development of the Yorkshire woollen and other industries, and clearly shows the advantage of teaching practical subjects by practical men, teachers who know what is required to be taught, and who know quite as well how to teach their subject, we are sorry to say this is the exception that proves the rule. We hope the Yorkshire College will receive that support due to it from the manufacturers of the district, as its success is clearly their gain.

The year that has just flown away has been a disappointing one for the

BLEACHER, DYER, AND CALICO PRINTER,

it having been stated that the calico printer is worse off than he had been for many years. About this time last year the *Manchester City News* published a series of articles on "Why the calico printers are losing money," which attracted some degree of attention from members of the trade, but more, we believe, from curiosity to endeavour to discover the *non-de-plume* of the writer, than from any other motive. There is no doubt that 1889 has been the worst year of the past decade for the members of this industry, but nothing else can be expected in these days if manufacturers will persist in going on with their work by "rule-of-thumb," and in clinging so tenaciously to the present vicious method of buying in their drugs. The industry is not likely to revive until the processes are all supervised by intelligent and technically instructed foremen, men who, knowing the practical necessities, have the gumption to weave in the scientific portion when and where required.

No new discoveries of any note have left a mark on the bleaching, dyeing, or calico printing industries during the past year. The fall in the value of bleaching powder will no doubt help the manufacturer in the future, as it is expected that the reduced price will be of long duration, and no doubt before long we shall see attempts made towards the recovery of the soda used in the "bowking" process, an economy yet unpractised, the liquid still being poured into the nearest water course.

Two law-suits in connection with the textile industries deserve to be chronicled; one wherein a tallow manufacturer was sued for damage, by quality of tallow supplied, and the jury found against him; the other case was the pollution of a stream of running water used by a bleacher, by refuse from a chemical works higher up the stream. This case strongly reminds us of one of *Æsop's* fables, and law-suits generally

are fairly well described by the lines of one of Spenser's poems:—

"Full little knowest thou that hast not tried
What hell it is in suing long to bide;
To loose good dayes that might be better spent,
To waste long nights in pensive discontent.
To speed to-day, to be put back to-morrow;
To feed on hope, to pine with feare and sorrow.

* * * * *

To fret thy soule with crosses and with cares,
To eate thy heart through comfortlesse dispaire;
To fawn, to crowche, to waite, to ryde, to ronne,
To spend, to give, to want, to be undonne."—*Spenser*.

Perhaps the year '89 has been most propitious to

THE MERCHANT

who has conducted his business with due regard for the future. In our last New Year's number we pointed out that there seemed every hope for a revival of trade, especially in the chemical and allied industries, and in many instances this has been so where the free course of trade had not been previously fettered by protectionist conventions; these industries which have been hindered in their free expansion will have to find their normal level before they commence to improve. Iron and coal and salt have assumed values far in excess of what even the most sanguine seller could have dreamed of two years ago, and the time has come when more economy will have to be practised in the use of all these things. It is notorious that excessive waste has taken place in the use of these two last commodities for many years past, with the result of excessive air pollution. The merchant will in many cases benefit, but the lesson to be learned is the necessity for the manufacturer to study the commercial aspect of the situation more deeply, and to delegate a little more of the works management to technical and trustworthy hands. Early on in the year '89 it was seen that a rise in the price of iron was inevitable; the rise in the price of coal was also a foregone conclusion, yet all the while makers of chemical products were wrangling away over conventions instead of improving the yield of their processes. Sulphuric acid, especially in Yorkshire, has experienced an immense rise in price; B.O.V. was early in the year advanced 2s. 6d., then shortly after, another 2s. 6d., and finally 7s. 6d., so that if there was a profit before the rise, there must be a substantial one now. Whether this prosperity will result in other works being built, remains to be seen, but it has had the effect of causing large users to erect chambers for manufacturing their own requirements.

In glancing over the history of the past year, we observe an almost uninterrupted improvement in

MANURES AND MANURE MATERIALS

of all kinds, if we except sulphate of ammonia, which has just maintained the price of this time last year, and nitrate of soda, which, owing to causes we shall presently discuss, has reached a lower point than we ever remember at this period of the year.

The rapid advance in Charleston freights 18 months ago, causing an equivalent advance in the c.f. and i. price of phosphate rock, having seriously curtailed purchases for United Kingdom during the latter half of 1888, it was anticipated that a large stock of rock would have accumulated at the shipping ports, and that with easier freights after the cotton shipping season easier prices might be expected, but when it transpired that the United States had taken all the available supplies of rock, the United Kingdom buyers began to realise that only a very material drop in freights could afford them any hope of a return to anything like the former level of prices. 1889 opened with somewhat easier freights, but, having no surplus stocks of rock, shippers were still very firm and were still able to obtain 9d. per unit c.i.f. to United Kingdom—in some cases 9½d. for prompt shipment. Up to April buyers still held off as far as possible, but with their Autumn requirements staring them in the face they were then compelled to make their purchases, and a large business was done at 9½d. c.i.f. to United Kingdom. In May

freights fell to within 5s. per ton of the lowest point of 1888, but only for a short time, and with the aid of the huge United States demand, shippers were able to maintain their price, and, by the end of July, to advance it to 10d. per unit c.i.f. Since then the market has steadily hardened, and at the close of the year shippers almost refuse to quote ahead—the value being fully 11d. per unit for cargoes c.i.f. to United Kingdom ports.

The shipping season for Canadian phosphate opened at 9d. for 70 %, 10½d. for 75 %, and 1s. for 80 %, with a ¼th rise, delivered Thames, Mersey, or Clyde, and continued at those prices until in April, in sympathy with other phosphates, it was advanced to 9½d., 11d., and 13d., and in May to 10d., 11½d., and 13d., for 70, 75, and 80 % respectively. In August, considerable business was done at 10½d. and 10½d. for 70 %, 1s. for 75 %, 13½d. for 80 %, and more money has since been paid. Very full prices have been bid for 1890 shipment, but so far shippers refuse to commit themselves, looking for something near 1s. for 70 % and relative prices for 75 and 80 % strength later on.

Large shipments of Somme and Belgian have been made during the year, Somme at prices ranging from 8½d. and 10d. for 55/60 %, and 9½d. and 11d. for 60/65 %, ¼th rise; Belgian at ¼d. to 1d. per unit more for the same strengths. Aruba has kept on about the same level of prices as Canadian for 75 %, with ¼th rise.

Bone Ash early in the year was somewhat neglected, and could easily be bought at about £4. 2s. 6d. on 70 per cent. in cargoes, but in March £4. 5s. had been paid, and at the end of May the whole of the 1889 South American production was quietly bought up for German account at from £4. 5s. to £4. 7s. 6d. per ton on 70 per cent., Hamburg terms. In August re-selling commenced at £4. 13s. 9d., Hamburg terms, and a large portion of the River Plate supply has since changed hands at up to £5. 2s. 6d. on 70 per cent. Closing quotation is £5. 5s.

The year opened with a very firm market for River Plate cargoes of bones, £5. being required for United Kingdom or Continent, but in February the value fell to £4. 15s.; and in April a large arrived cargo was sold at £4. 10s. In May, however, the United States having come in as a large buyer for summer and autumn shipment, price was again advanced to £5. for shipment, though an April cargo was subsequently sold at £4. 16s. 3d. Since then values have steadily advanced, to £5. in July, £5. 5s. in August, £5. 7s. 6d. in September, £5. 8s. 9d. in October, and £5. 10s. in November, for United Kingdom or Continent, the United States all the time paying rather more and securing nearly the whole of the River Plate supply as well as several thousand tons Mediterranean. United Kingdom has had to depend largely upon East Indian crushed bones and bone meal. Prices of crushed bones have ranged from £4. 6s. 3d. in March, for autumn shipment, up to £5. 10s. on spot in December, the latter price being now nearest value in any position. East Indian bone meal opened at £5. in January last, falling as low as £4. 12s. 6d. on spot in March, under pressure of heavy arrivals. For shipment, however, the lowest price touched was £4. 17s. 6d. in April, since when it has gradually advanced to £5. 12s. 6d. delivered Thames, Mersey, or Clyde—the closing value. It should be remarked that speculators have got hold of the bulk of the supplies for shipment December forward, but still we do not think that prices have been so far unduly forced, having regard to the present values of mineral phosphates and the very large U.S. requirements of phosphatic manure material.

Turning to nitrogenous material, nitrate of soda claims first attention. A year ago this article stood at 11s., which price was practically maintained up to the end of March, thanks to the skilful manipulation of shippers and speculators who contrived to delude buyers into the belief that there was bound to be a scarcity of supply for the spring demand, though by the end of June the visible supply had increased within the twelve months no less than 100,000 tons. The movement, however, collapsed at the end of March under pressure of figures, and by the end of May 8s. 4½d. was touched, price quite as high as was warranted by the figures. Since the spot price has varied from 8s. 3d. end of October,

8s. 9d. end of November, when it was stated that three-fourths of the nitrate works would be stopped throughout December. There has been no stoppage, however, and the close of the year finds us again at 8s. 4½d., and with an increase of visible supply within the twelve months of something like 150,000 tons. So far as can be seen the prospects of nitrate were never more hopeless, and only an actual stoppage of production over a considerable period, or a material curtailment of output all round, can save the market from a further serious decline. There can be no question that the capacity to produce has been enormously increased within the last few years, owing to the formation of limited companies out of the old private concerns and the consequent introduction of larger capital and better appliances. It recently transpired that one of the leading companies had within the last two years increased its output capacity from 150,000 qtls. per six months to 280,000 qtls.; and if the other companies have increased theirs in anything like the same proportion, what has been said above only becomes the more evident. No doubt a low price for nitrate will stimulate the consumption, but it must take a long time before it can meet the present output capacity.

Sulphate of ammonia has apparently not been influenced by nitrate of soda at all, but actually, we think, it has, and that the influence of nitrate has been counterbalanced by that of extreme scarcity and relatively high prices of all other kinds of nitrogenous material. The present price of sulphate works out only to 10s. per unit of ammonia, whereas dried blood is fetching quite 11s. 6d. per unit, and Liebig's and other similar meat guanos would find ready buyers at over 11s. per unit of ammonia. So that where sulphate ammonia can be substituted it is substituted, and we are of opinion that only this cause has saved sulphate from a very considerable decline in value. Superphosphate has maintained a very firm position throughout the year, excepting for a short time in May and June, when, to clear their surplus stock, manufacturers submitted to lower prices, opening with 45s. per ton in bulk, f.o.r. at works, for 26 per cent., that price was maintained until late in May, when as low as 40s. was accepted. The market, however, recovered in August, along with advanced prices for materials, and 45s. again became the current quotation. Closing value cannot be put under 46s. 3d. in bulk f.o.r. at works.

There are three facts which we think manure manufacturers would do well to take into account in making provision for the future—the increased buying capacity of the British farmer, the enormously increasing demand for all kinds of manure material for the United States, and the inadequacy of new sources of supply. We think these facts point to a higher range of prices over 1890 than we have had in 1889, excepting for nitrate of soda, and sulphate ammonia in so far as it may be affected by nitrate.

And now we must say a few words

TO OUR READERS

who have appreciated the value of accurate trade information disseminated amongst them at short intervals. This is clearly shown us by the support accorded to the *Chemical Trade Journal* by the members of the chemical and allied industries both at home and abroad. We have now a very fair circulation all over the civilised world, and in the current year we hope to materially improve the Journal and make it even more interesting to subscribers outside the general body of manufacturers of heavy chemicals. The number of industries in the United Kingdom depending more or less upon commercial chemistry is legion, and we shall not be satisfied until we have gathered them all into our fold.

We are now entering into our sixth volume, and the experiences of the past five have not been thrown away upon us; we can see now, even more clearly than before, the great need of a Journal carried on upon the lines we have followed up to to-day, not only to be written for the makers of chemicals pure and simple, but to be a bond of union between the producer and consumer, to be the medium of announcing new products and criticising new processes in a manner that can only be done by private enterprise.

We have endeavoured to do all our work in connection with the Journal absolutely free from bias; we hope we have

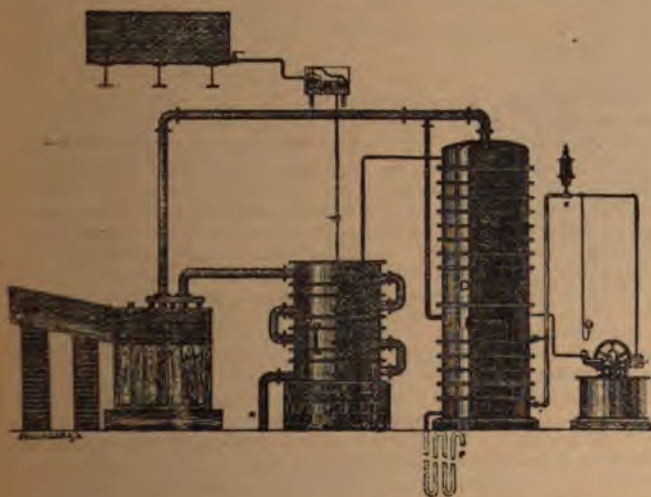
given praise where praise has been due, and if we have blamed where blame was considered deserving we hope to be credited with purity of intention; but withal, the fact remains, that if our remarks have any weight with our readers, as we hope they have, it will make us cautious in our dispensation of the Attic salt, of which all editors have more or less for disposal.

In many industries the new year bodes much good, but there are others that will not look so healthy at the close of '90 as at the end of '89. It would be invidious to particularise, we only hope that we may be mistaken in our forecast, and that all our readers may have

A HAPPY AND PROSPEROUS NEW YEAR.

AMMONIA STILL.

THE old-fashioned method of placing ammonia water in a boiler and blowing steam into it until all the carbonate and sulphide was driven over into sulphuric acid is very properly coming to a close. It has seen its day, may have rendered good service to its employers, but it cannot hold its own against newer and improved processes and machinery. Ten years ago the foregoing method was pretty generally adopted, but in many works dealing with ammonia salts, the gases and steam passing away from the last boiling were utilised in a tall tower filled with bricks, and down which the gas liquor was made to flow. In this form of apparatus the quantity of steam used was enormous, and we have known of instances where 30 cwt. of fuel have been required to each ton of sulphate of ammonia produced. Moreover, the amount of lime employed with the old form of apparatus was such that one never went into a sulphate works without seeing an enormous heap of it piled up somewhere, and there were always constant complaints of the irregular character, and the large quantity of ammonia left in the spent water. Nevertheless the old process was for a long time in much favour, and manufacturers did not look with approbation upon the apparent complications of the new form of still, which in 1878 was presented to their notice. We allude now to the Grüneberg still, of which there are many in use abroad, but very few in this country.



The column still has been much improved of late years, and perhaps the best design is that made by Messrs. Ashmore, Benson, Pease and Co., the gas engineers of Stockton-on-Tees. The accompanying illustration represents a complete apparatus guaranteed to produce twenty tons of sulphate of ammonia per week from 5° Tw. liquor of good quality, while if the liquor is 5½° Tw. it will produce 25 tons, and from 6° Tw. 30 tons weekly.

The apparatus consists, as shown, of an overhead tank, in which an adequate supply of gaswater is constantly kept. From this tank it flows into a small regulating tank, fitted with a lever and float, so constructed to keep a constant level, and so ensure the regular and even run of liquor through the apparatus. The remainder of the plant consists of a tall column still, a heater of peculiar construction, containing no internal joints, the ordinary and well-known saturator from which the sulphate is fished, and a vessel from which the lime is fed continuously into the still. The saturator being of the ordinary kind does not require any description, and the same may be said of the lime vessel, with the exception that it is not used for making up the

lime in, but only for containing a supply of finely-sieved milk for pumping into the still.

The heater into which the gas-water first runs from the regulating tank above, receives the waste steam and gases from the saturator, and, passing forwards to the outlet, heats up the gas liquor in its passage, so that when the still is properly at work the gaswater enters the tall still at 160° F., while the gases escape at 100°-120° F. If the heater is overworked the exit gases will be hotter than the liquor going into the still, and this is not desirable. The heater is so constructed that all the joints are visible, and outside, *i.e.*, round the periphery, so that if a leakage takes place it is at once detected. The heater is the weakest point in all other sulphate apparatus, but the one illustrated gets over every difficulty which has been urged against them. In the earlier forms of this still the tall column consisted of a series of plates perforated with a large number of quarter-inch holes through which the steam passed, the liquor passing down from plate to plate by means of overflow pipes. This form is now made for special work, but it possesses the disadvantage that it will only work the exact quantity it is designed for. It does its work admirably, but when the supply of liquor is decreased from the normal, the reduced pressure lets the liquor fall from tray to tray, and when the steam-pressure is increased to meet a larger liquor supply, the steam cannot get quickly enough through the plates.

The new still, such as is illustrated above, and as made by Messrs. Ashmore, Benson, Pease and Co., overcomes all the foregoing difficulties. A four-foot still in experienced hands can be made to work any quantity of sulphate, or liquor representing it, from 50 to 500 gallons per hour. When working 300 gallons per hour, the amount of ammonia left in the spent water is so small that it has to be Nesslerised, whilst, when working 500 gallons per hour, the quantity need not exceed 0.006 per cent., if due care be exercised in the supply of milk of lime.

The amount of fuel employed naturally varies according to the strength of the liquor operated upon, the degree of perfection of the non-conducting covering with which the still is closed, and the amount worked through the still, the point of greatest economy is that which the still is guaranteed to do. Thus a four feet still is at its greatest perfection when working so as to produce 20 tons of sulphate per week from 9° Tw. liquor, and when covered with two inches in thickness of Haack's fossil meal covering, this, together with the heating of the boiler feed-water by means of the heat in the spent liquor, will require a consumption of coal equal to four cwt. per ton of sulphate: with 6½° Tw. liquor, but without the heating of the boiler feed-water, the coal consumption is 6¼ cwt. per ton of sulphate, while with 5½° Tw. liquor the consumption is 7 cwt. The cost of making sulphate by means of these stills as follows:—

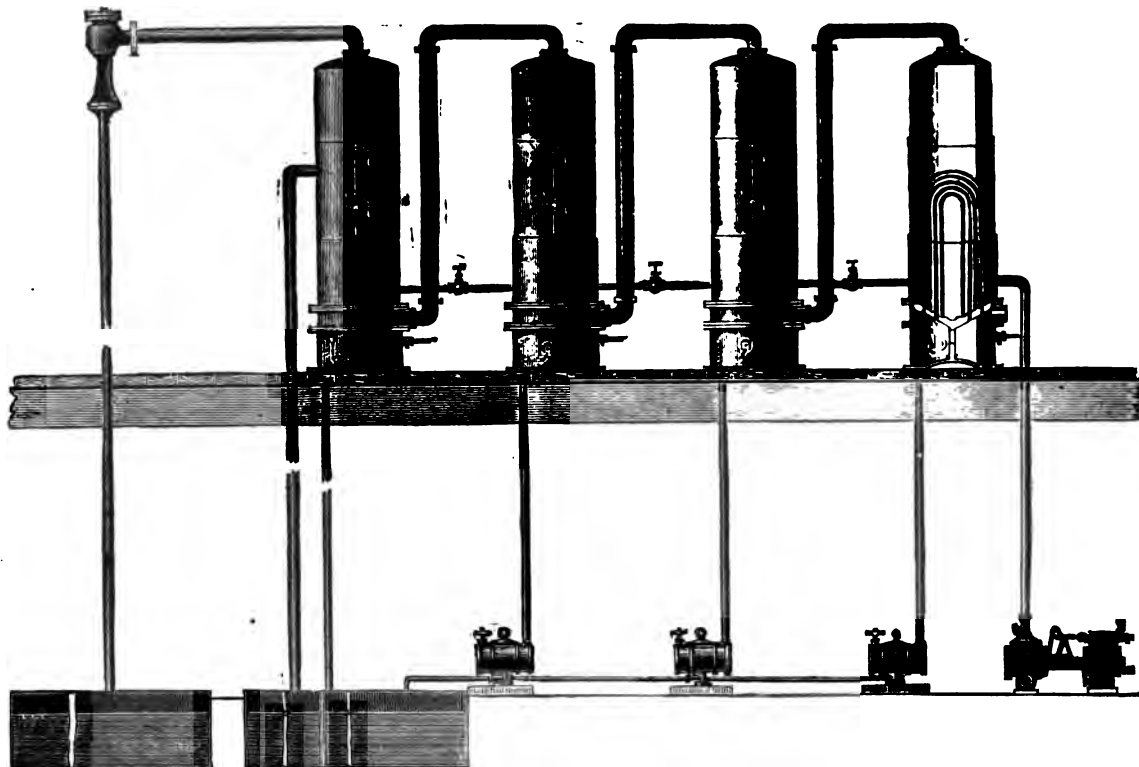
	£	s.	d.
Vitriol (ordinary chamber acid)	1	15	0
Fuel 7 cwt. at 6s.	0	2	1
Lime.....	0	1	6
Bags.....	0	3	6
Labour.....	0	4	0
	£2.	6	1

Of course in some places acid will be dearer than this, and in other places cheaper; but we presume the price quoted will be the general average. The amount of lime will vary according to the whim of the workman; it is of no use putting a large quantity of thick lime into the still. In ordinary liquors the fixed ammonia requires about 2½ cwt. to the ton of sulphate, and this may be obtained as a thin milk from about 3 cwt. of lump lime, when sieved through a screen (in the wet state) having 30 wires to the inch. This still enables the foul gases to be dealt with easily. As a rule these gases pass away from the heater much below the temperature of boiling water, so that they require but little cooling and can be burned with ease, and the products of combustion sent into the vitriol chambers where they make a substantial amount of sulphuric acid. Theoretically, the sulphuretted hydrogen evolved from the distillation of gaswater should give back about one quarter of the vitriol needed for the conversion of the ammonia into sulphate, and this enables the foul gases to be readily and economically dealt with.

THE CONDITION OF THE SALFORD SEWAGE WORKS was discussed at a recent meeting of the Town Council. A resolution, moved by Mr. Alderman Walmsley, in favour of removing the sewage works and the treatment of sewage from the control of the Building Committee, was rejected. The Council appointed a committee to consider and report as to the establishment of a technical school for Salford; and a step was taken, by the adoption of a report presented by the Town Clerk, in the direction of improving the condition of artisans' dwellings in the borough.

EVAPORATION BY MULTIPLE EFFECT.

THE BERRYMAN MULTIPLE STILL.



MANY years ago a patent was taken out by John Dale, for evaporating soda liquors by multiple effect; but, like most specifications of that date, when chemical industry was young, the instructions, if duly carried out, could have led to nothing but failure. It is not clear whether Dale recognised that he was utilising the latent heat of the steam in each successive effect, but anyhow, nothing came of the project, and soda liquors continued and continue to the present day to be boiled up in open cast-iron or wrought-iron vessels. In these evaporating pans about four pounds of water (not more) are evaporated per pound of fuel, so it will be seen there is a great room for improvement. Evaporation, by means of steam coils placed in the liquor to be evaporated, is much more economical, as, if a boiler is not overworked, 10 pounds of water can be converted into steam of 30 pounds pressure, by the combustion of a pound of coal, and every pound of steam condensed in an evaporating coil, will evaporate nearly a pound of water if the liquid is already at the boiling point. But if we consider that 10 per cent. is utilised in heating up the liquor to its boiling point, then 10 pounds of water, condensed in the coil, should evaporate nine pounds of water from the surrounding medium, and while the coil is kept full of steam and connected with a good steam trap, there cannot be any waste of the heating agent. Moreover, in many factories hot clean water is a desideratum, and after the steam has done its work there it remains as condensed water, useful for boiler feeding or for a multitude of other purposes.

Nine pounds of water evaporated per pound of fuel may be reckoned on with a single effect where ten pounds is the work of the boiler, but it is when several stills are combined in multiple effect that the economy comes in. The latent heat of the steam from the first effect instead of escaping unutilised passes into the second effect and yields us another nine pounds there, and so on for the addition of each still or effect as the French engineers have styled them.

Upon the supposition that ten pounds of water is the duty of one pound of fuel, in the steam boilers, two effects will evaporate 18 lbs. of water per pound of fuel; three effects, 27; four effects, 36; five effects, 45; six effects, 54; seven effects, 63; eight effects, 72; nine effects, 81; and ten effects, 90 lbs. of water per pound of fuel.

Most of the apparatus working on this principle is very intricate and expensive, and therefore, they have not come into general use, even

in situations where they would have been exceedingly economical, but with a lower cost, and when they become better known it is very probable we shall find a more extended application. Messrs. Joseph Wright and Co., of Tipton, have to a great extent solved the difficulty as to cost. They have adapted the well-known "Berryman" feed-water heater to the purposes of a multiple still and have fitted up at their works a system of four effects, in order to show them working to their intending customers. The illustration will give the reader an idea of their construction, and of the small space they take up.

The woodcut shows a system of four effects, the steam is supplied from the steam boiler to the first effect, and the steam raised in the first still passes into the coil of the second, and so on throughout the series, all the water formed by condensation of the steam in the various coils is let out by means of the steam traps placed on the ground level. The liquor to be evaporated is pumped into the first effect in a constant stream, and the flow from still to still is regulated by means of an ordinary graduated tap. The last effect is worked under a vacuum of 26 inches of mercury, at which pressure water boils at 120°F. The vacuum is produced while absorbing the heat given off by the vapour in the last effect, and no special air pump is necessary with this system, the fall of the condensing water doing the work very efficiently. The concentrated liquid runs out of the still automatically, so that the degree of concentration depends entirely upon the rate at which the liquor is pumped through the apparatus. The stills are placed about 26 feet or more above the ground level, that is about equivalent to the second floor of a building, but the liquor supply pump and the tanks for weak and concentrated liquors are placed upon the ground floor. In this position the apparatus is as well nigh automatic as it can be, the steam is drawn away and condensed by means of a jet condenser, and a sixteen feet fall of water can be made to produce a 27 inch vacuum, when supplying sufficient water to condense the whole of the steam from the last still. The liquor being pumped into the first still at a given rate, evaporation goes on during its passage from still to still, until it reaches the overflow from the last still from whence it flows into the tank placed to receive it. If space will not permit of this arrangement, an air-pump of the ordinary pattern is used to extract the liquor from the last effect, and in such case the whole of the apparatus may be placed a few feet above the ground level.

Industrial Celebrities.

V.

PETER SPENCE.

LORD Macaulay in his essay on Milton describes the Puritans as:—"Men whose minds had derived a peculiar character from the daily contemplation of superior beings and eternal interests. Not content with acknowledging in general terms an over-ruling Providence, they habitually ascribed every event to the will of the Great Being, for whose power nothing was too vast, for whose inspection nothing was too minute. To know Him, to serve Him, to enjoy Him, was with them the great end of existence. If they were unacquainted with the works of philosophers and poets, they were deeply read in the works of God. If their names were not found on the register of heralds, they were recorded in the Book of Life." It was from families of this class that Peter Spence was descended. His mother's family had for generations farmed lands, situated on the Grampians; his father was a hand-loom weaver in the burgh of Brechin. Though of lowly station, his parents were distinguished for their genuine piety and lofty character; his father commanded the greatest veneration, he was a man of wisdom and sound judgment, of great purity and uprightness.

Peter Spence was born at Brechin, on the 19th February, 1806, and in the parish school of that town he acquired the rudiments of knowledge; he was trained to a life of hardihood and industry, and from his earliest years was made familiar with a religious life and doctrine that had in them much that was intensely stern and narrow, but which, nevertheless, produced characters of great strength and beauty.

At an early age he was sent from home to the city of Perth, where he was apprenticed to a grocer. During these years he manifested a great love of reading, works on science having a peculiar attraction for him. We shall see how in after years Peter Spence became a fertile inventor, but in his earlier years when he was engaged in the prosaic duties of a grocer's store he manifested the gifts of the poet.

There lies before us a volume of his poems "written in early life." His thoughts are revealed to us in the subjects he has selected:

"In the Primeval Forest,"
 "The Destruction of Pompeii,"
 "Ode to Palestine,"
 "The Death of Bolivar,"
 "Navarino,"
 "Napoleon's Russian Campaign,"

and others similar. But it is not merely in efforts to sing the glories of nature, or the great tragedies of history, or the struggles of patriots for freedom that he invokes his muse, he can delight us with a pretty ballad, "The Tale of a Minstrel," or amuse us with a clever, witty parody on Gray's Elegy:—

"Beneath yon rugged elms, that beech tree's shade,
 Where rests the river o'er its pebbly bed,
 Each in his place the finny tribe is laid
 Till tide shall help them o'er the ford to sped.
 Ah, soon for them, the angler with his rod,
 With wormy bait, or fly hook feathery clad,
 Or fisher's net shall lay them on the sod
 To writhe with pain and make their captors glad.
 Ah, soon for them the blazing hearth shall burn,
 And cook shall then the oily sauce prepare,
 While gourmand Cockneys to the dish return
 And gobble each his more than glutton share.
 Let not ambition mock the humble theme
 That now expands obedient to my wish,
 Nor cast aside, as 'twere an idle dream
 The short and simple annals of a fish."

We have selected these few verses just to illustrate his humour. There are sonnets, and there is a pretty little poem he terms "A Lyric," of which we also venture to quote a verse or two, to show the man.

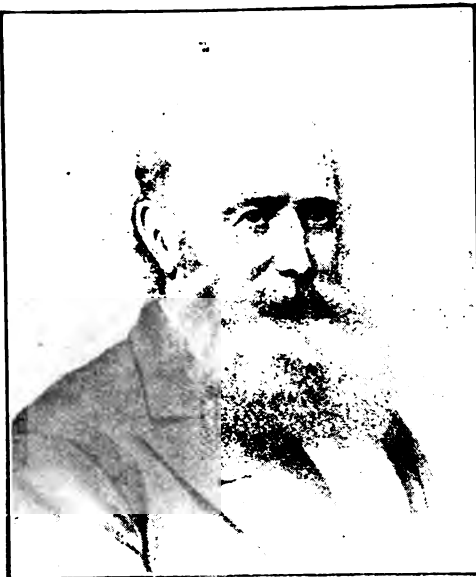
"I love the land where my fathers have dwelt,
 The rock, and the stream, and the plain,
 I love to read how the southern felt
 The might of these patriot men.

I love the stream where
 And the slippery slid
 And the big stepping st
 To run our little mill
 I love to look on a han
 (And many a one I se
 When a smile on her ru
 And I love when she
 I love to engage in a fri
 With one who will an
 I love to hear others my
 Who does not, may sa

The industrious apprentice, the so
 youth is, we believe, a faithful pictu
 he spent in the city of Perth and its
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PETER SPENCE.

The London venture was a failure and no outlet for some eight or nine years. Spence able to do anything that he although he had been incessantly employed of November in that year, he sought the manufacture of copperas and alum. This accident; he had been seeking in every alumina, and was at this time experimenting had been a failure, and he but after he had one day completed his left the materials in the basin which the next morning to his delight and surprise crystals. This accident was the foundation

The scene of his labours is now transferred to Cumberland. He here manufactures alum from burnt or calcined coal designed to obtain liquors, sufficiently concentrated to crystallise without any supplementary the initiation of Spence's alum process, completely to revolutionise the alum trade product, as very greatly to increase its cost.

But Cumberland was not the best place. Spence soon saw that Manchester and its neighbourhood was more advantageously situated; coal shale could be obtained, close at hand, and the means were equally convenient.

The next patented invention came from Pendleton, on the 12th November 1850, and this was also for alum, and with it cement: The previous patent was very crude and simple, but it contained the germ, which during the succeeding five years had developed until the one now under consideration appeared, which was in every way very much more complete.

Shale from the coal measures is the raw material which he principally relies on. After being calcined in large heaps over flues, the burnt shales are cast, warm, into leaden tanks in which there is sulphuric acid: the shales in time absorb up the acid and become quite dry. The vat is then emptied of these saturated shales, which are put into another vat and covered with boiling liquor; the sulphate of alumina is hereby dissolved out, and crystallised alum obtained. If it is found the sulphate of alumina is not sufficiently soluble, that the shales have not been sufficiently acted on by the sulphuric acid, the saturated shales are heated in the furnace and then put into the dissolving vat. But one point Spence kept in view was that no expense must be incurred by any process of evaporation prior to crystallisation—"the clear solutions of sulphate of alumina must be of sufficient strength for the crystallisation of alum without evaporation."

The same patent specifies that the mother liquors obtained after the alum is crystallised out, and which contain a considerable quantity of free sulphuric acid, shall be stored in a covered tank, this tank shall have a pipe at the top leading to the flue or chimney, and another, a lead pipe, leading into it at the bottom to convey ammoniacal compounds and vapour of water, obtained when ammoniacal gas liquor is being boiled or distilled into it. Sulphate of ammonia is formed, quantities of sulphuretted are given off, this gas is conveyed away to the chimney and the sulphate liquor is used in mixing with the sulphate of alumina, and so forming ammonia alum. The same specification claims a process for distilling ammoniacal gas liquor and other volatile, or partially volatile, liquors by an arrangement of two or more boilers or vessels, by which the liquid to be distilled can be run from one to the other through the whole range, and the passing of steam charged with volatile matter from one to the other through the whole range in an opposite direction.

The formation of cement, which he calls Patent Zinc Cement, from the spent shale after the sulphate of alumina was washed out, was another item of this most inclusive patent.

He took two parts of refuse lime from the gas works, and one part of his spent shale, and to that he added a little sulphate of zinc solution; these are mixed to about the consistence of mortar made into bricks, and dried, afterwards calcined or burnt at a moderate red heat, after cooling it is finely ground and constitutes cement.

The zinc was used for two purposes: to prevent the oxydisation of any iron, and so causing the colour of the stone to be degraded, and also to prevent the stone being attacked by mosses and lichens.

The last point he claimed is one of much interest; it related to the manufacture of the carbonates of the alkalies from the sulphates by means of sulphate of baryta.

Powdered sulphate of baryta was mixed with carbonaceous matter and heated. After this mixture is burnt it is lixiviated, and a solution of sulphide of barium is obtained; to this the sulphate of the alkalies (in solution) is added, sulphate of baryta is thrown down, and the sulphide of the alkali remains in solution. This solution is pumped into a tank, in which it is heated to boiling, and then run through a tower packed with coke, through an atmosphere of carbonic acid gas; carbonate of the alkali is formed and sulphuretted hydrogen is given off, which is collected and burnt to produce sulphuric acid; the liquor which runs through the tower is collected in a tank and evaporated to soda ash, or is made into soda crystals. Spence says "I am aware that a process similar to this has been previously described, but the temperature was not raised, my point being that the liquor must be acted on at an elevated temperature."

Spence's alum process was a very great success, both chemically and commercially, and at Pendleton his business rapidly grew, until he was the chief alum manufacturer in the world.

The prosperity that attended him enabled him to prosecute various researches, and from this time forth the records of the Patent Office reveal how varied were the subjects he investigated, and how fertile he was in resource.

It is impossible for us in this short article to follow his labours and ideas as they are unfolded in his various patents; we must content ourselves with classifying the patents and summarising their results.

The patent last described, and worked out at the Pendleton Alum Works, was his main achievement. On it he built up a vast and successful business; and the other patents to which we shall advert are quite subsidiary as compared to it.

Following are the subjects to which his patents refer:—

1. Prussian Blue and Prussiate of Potash.

2. Manufacture of Sulphate of Alumina and Alum.

3. Manufacture of Copperas.

4. Manufacture of Sulphuric Acid, and obtaining Sulphur from Pyrites.

5. Calcination of Copper and other ores.
6. Separation of Copper from its ores.
7. Separation of Zinc from its ores.
8. Separation of various metals from their ores.
9. Purification of Gas.
10. Production of Salammoniac.
11. Manufacture of Sulphocyanide of Ammonium.
12. Manufacture of White Lead.
13. Treatment of Phosphate of Alumina and Iron.
14. Treatment of Sewage.
15. Manufacture of Manure.
16. Treatment of Bauxite, and the Manufacture of Aluminoferric Cake.
17. Purification of Water.
18. Treatment of Gases arising from the manufacture of Salts of Ammonia from Gas Liquors.
19. The Use of Oxide of Manganese in Freeing Sulphate of Alumina Solutions from Iron.
20. Obtaining Power by Steam.
21. Repairing Fractured Bells.

Most of the above are the subjects of more than one patent, some of several, and the same subject is treated after the interval of several years. Some of the patents are modifications and improvements of preceding patents, others put forth entirely new ideas. Some had little or no practical value, others revealed results and methods of great and permanent interest; and nearly all assist in marking the progress of chemical discovery in the sphere to which they apply.

One of his patents for producing Prussian blue and prussiate of potash, illustrates his tendency to try and utilise refuse. He employed the alkaline sulphates, fused them in a pot, and, when in a fused state, added refuse leather, and calcined them together; then lixiviated and crystallised. To the mother liquors he added sulphuric acid, and converted the alkalies into the sulphates. This being done, he added sulphate of iron, and so precipitated Prussian blue.

In the Island of Anglesey, at the Parys Mine, there are enormous heaps of refuse ore, called bluestone. It contains of zinc, lead, copper, and a little silver, but the percentages of the various metals are so low that metallurgists have failed to devise a method to extract any or all the metals, so as to make the process a commercial success.

To use up this abundant refuse, which is found in numerous localities in many parts of the world, has been one of the problems which metallurgists have failed to solve. Peter Spence tried his hand at it. He ground the ore into a fine powder, and treated it with hydrochloric acid, so dissolving out the sulphide of lead, the sulphide of zinc remaining unacted on; the undissolved blend he calcined, and extracted the zinc by volatilising it in the usual way, and the residue containing the copper and silver he melted, and separated the metals by one of the well-known processes. He succeeded no better than others who have undertaken the same work. Then his treatment of copper ores was, by two or three methods, to bring the copper into solution, and out of the solution to precipitate the copper as sulphide with sulphuretted hydrogen obtained from chemical waste.

In his smelting processes, his patents refer to the construction of calciners. His object was to utilise, as much as possible, waste heat, and to bring the calcined ore, while hot, direct from the calciners into the melters. Some of his furnaces were built directly over the smelting furnaces, and others had a series of floors and the ore was drawn from one to the other; then, again, he invented a mechanical rabble which worked backwards and forwards at intervals, and he designed a method for cooling this rabble so as to prevent its destruction.

But the "Henderson" process excelled all his attempts to treat copper ores by the wet way. His calciners are still used in certain districts, where "smalls" are plentiful.

The discovery of immense quantities of phosphate of alumina and iron in the West Indies, on the island of Redonda, aroused him to seek to discover a method of utilising this mineral, so as to produce alum from the alumina, and use the phosphoric acid in the manufacture of manures. He patented two processes, the first in 1870, which was incomplete, and was perfected by a second patent in 1873. The first idea was to dissolve the phosphate of alumina in sulphuric acid, and to the solution add ammonia or potash to form an alum; then crystallise. To the mother liquor add ammoniacal gas water, iron and any residue of alumina were precipitated, and the clear liquor was boiled down and dried to a state fit for manure; the amendment of this patent was that after the iron, etc., had been thrown down by the ammoniacal gas water and phosphate of ammonia obtained, pure ammonia was added to the monophosphate, and a tribasic phosphate of ammonia was formed.

The second process consisted in mixing the mineral phosphate with sulphate of soda (salt cake) coal and a little oxide of iron, and heating these together until decomposition took place; then lixiviating out the phosphate of soda that is formed; to this solution caustic lime is added, phosphate of lime is precipitated, and caustic soda remains in the liquor, this is boiled down in the usual way; the precipitated

phosphate is either used as it is, or it is converted into superphosphate.

Spence was so confident of the success of this process that he decided to erect plant on a large scale, and to alter the arrangement of his works. He was too sanguine, and his conclusions were at least premature, for after incurring heavy expense, the process had to be abandoned, and large quantities of the mineral were thrown on his hands.

His manufacture of sulpho-cyanide of ammonium was also an invention worthy of note. He patented this first in 1863, and completed it in 1864. In this process he utilised the ammoniacal liquor from gas works, drove off the volatile salts of ammonia, and then crystallised the chloride of ammonium.

The mother liquor he then diluted so as to precipitate extraneous matters, and the clear solution was taken for use. To this was added a mixed solution of sulphate of iron and copper, by which sulpho-cyanide of copper is produced, which, being treated with a solution of sulphide of ammonium the copper was separated, and sulphocyanide of ammonium formed and obtained in crystals.

In 1875 he took out in connection with his son Frank his first patent for the treatment of Bauxite and the production of Alumino-ferric cake. These salts he found to be of value in the purification of sewage, and also in the purification of water; valuable also in paper-making and dyeing.

His last patent, taken out just a year before he died, is the one unhappily associated with the memorable law suit between A. G. Kurtz and Co., of St. Helens, and his firm. The invention is that in solutions of sulphate of alumina, which contain iron, the iron is precipitated by black oxide of manganese being added to the liquor when hot, before the sediment has settled out. The iron goes down with the manganese.

The same tastes that induced Peter Spence, as a youth, to be an active member of the Debating Society, at Brechin, caused him to take a lively interest in the proceedings of the Manchester Literary and Philosophical Society.

Several papers which he read before that society are published; they have principally a scientific, rather than a literary, interest.

A favourite theme of his was embodied in a paper read before the society and published in pamphlet form in the year 1857, it is entitled "Coal, Smoke and Sewage scientifically and practically considered, with suggestions for the sanitary improvement of the drainage of towns, and the beneficial application of the sewage." He divided the contamination of the atmosphere proceeding from drains and chimneys into evils visible and invisible, and the latter he regarded as much more pernicious than the former. The removal of solid filth from drains and cesspools, and of black smoke and soot from chimneys was, he considered, a most imperfect, crude, and unscientific method of dealing with the evils.

He writes: "The invisible evil is completely ignored, the smoke nuisance is held as the evil of our atmospheric condition. 'Burn your smoke,' is the united cry of the Sanitary Association, the public, and the law." He calls the attempt to do away entirely with black smoke "the sanitary smoke-consuming mania."

Perfect freedom from smoke would, if accomplished, only increase the evil arising from the purely gaseous results of combustion; and again: "While demonstrating that to the mere economist, there is great inducement to get rid of all visible smoke, as a consequence of his obtaining perfect combustion of fuel, I would at the same time say to the sanitary smoke consumer, that he had better not interfere further, as every step he takes in enforcing the consumption of smoke, will only tend to deteriorate the atmosphere, and that every cloud of visible smoke he is successful in dispelling, is only making way for a more baneful, though invisible agent." He regarded carbonic acid, carbonic oxide, sulphurous and sulphuric acids, as far more prejudicial to health than visible smoke; indeed, he believed soot to have an antiseptic influence, and to be beneficial rather than prejudicial.

From the economical standpoint he did not advocate permitting imperfect combustion, but he would construct apparatus that all ammonia would be condensed and converted into sulphate of ammonia, and such gases as could not be condensed and utilised should be carried up lofty stacks, and diffused before they could alight among human habitations, and so become innocuous.

The nitrogen, phosphates, and alkalis in sewage he would also utilise; he regarded the system of town drainage into watercourses wasteful and injurious in the extreme. In fact, he would have all house flues connected with drains; the drains should be smoke culverts as well as water conduits; the gases resulting from combustion would act destructively on the sewage gases, and both should be carried away by means of a very strong draft up very lofty chimneys; his idea was 600 feet high, at least.

The vision, his projects presented to his mind, he thus described:—"The removal from the interior of all our dwellings, from the mansion to the cottage, and even to the cellar, of the slightest trace of those pestiferous emanations which feed our fevers, consumption, and cholera, and which would, more than any other physical cause, serve to lower the vital energies of our town populations, making them an easy prey to every epidemic.

Instead of the atmosphere of our towns being, as now, a dim, and dull and murky compound of black and yellow and grey smoke, blended into a haze, and containing besides its proper elements a mixture of carbon, carbonic oxide, carbonic acid, and sulphurous acid gases, with the condensable hydro-carbon compounds of our domestic fires, we should then continually revel in an atmosphere transparent, pure, and salubrious as that which encircles the mountain's side, or reclines on the ocean's bosom; and instead of vegetation, with its charming green being banished from the interior of our towns, and even in their suburbs holding only a stunted, miserable, and withering struggle for life, every nook and corner where light could descend might then have its shrubs or its tree; our most bustling streets might be enlivened by the evergreen leaves of the climbing ivy, or with other parasitical plants, and might be made fragrant to the smell, while the eye was delighted with their beautiful and variegated flowers."

He felt assured these anticipations were not extravagant, that this vision was no chimera; but "a most desirable and practicable reality," which he was convinced would in time be realised.

It is mournful to contemplate, that in this very year, 1857, when he published this pamphlet, he was himself being assailed by a number of the residents of Pendleton, for permitting gases to issue from his works, which they asserted were noxious and injurious to health and vegetation.

The trial of Regina v. Spence, which occupied three days of August, 1857, when the firm was proceeded against for having so conducted their works as to be a public nuisance, is one of those notorious cases long to be remembered. Baron Channell was the Judge; Mr. Wilde, Q.C., was leading counsel for the plaintiff, and Sir Frederick Thesiger, Q.C., for the defendant. A large number of witnesses were called on both sides, and eminent experts in chemistry, horticulture, and botany gave evidence for and against.

Dr. E. Frankland, who, at that time was a professor at Owen's College, and who had been employed by Mr. Spence to superintend his processes, so as to be able to suggest, if possible, any apparatus or arrangement that might prevent any nuisance arising, was induced to give evidence for the plaintiff.

Mr. Spence felt this very much. Having retained Dr. Frankland's services, and being prepared, as far as possible, to carry out any improvements he could suggest, he considered Dr. Frankland had no right to side with the prosecutors against him. To say the least, it was an unfortunate circumstance, and we are not surprised that it gave rise to very bitter reproaches from Sir Frederick Thesiger. Dr. Angus Smith, and Professor Crace Calvert were called by Mr. Spence.

Scientific witnesses have too often justified a severe judgment that has been frequently pronounced against them; it is with satisfaction we find Baron Channell, referring to the scientific witnesses that gave evidence in this case, and saying: "I think, when you come to sift and examine for yourselves the evidence of those whom I have called scientific witnesses, you will not find a great discrepancy between them. There are a great many points upon which they agree, and the difference will really be with reference to those whom I have ventured to call the non-scientific witnesses."

The verdict went against Spence, but only on one count out of three; the jury found that a disagreeable smell emanated at times from the works, but that it was not proved that they were injurious either to health or vegetation. He was compelled to leave Pendleton and remove to the site of his present works at Miles Platting. He had anticipated that this would be the only way out of his troubles, and with that energy and foresight, which were so characteristic of him, had made his arrangements beforehand.

In reviewing this celebrated trial, we believe Peter Spence had to contend against a great amount of prejudice, and that the social position of those who instigated the proceedings, told heavily against him; we think also it was probably a mistake that the special jury were not brought over to view the works and the neighbourhood.

The Literary and Philosophical Society afforded him a constant and agreeable retreat from the worries of business; he frequently had interesting communications to make, and ably assisted in the discussion of scientific subjects, introduced by others.

He was much inclined to humour, and thoroughly enjoyed a joke; indeed, it was noticed that on the very day he died his bright humour did not forsake him.

One trait of his character used to exhibit itself at these meetings, his aversion to take anything for granted; he would try to test theories and to prove facts.

The question of the effect of cold on iron was raised at one of the meetings of the Society. A railway accident had just occurred, occasioned by the breaking of the tyres of the carriage wheels. It was generally advanced that cold and frost made iron and steel more brittle, but Dr. Joule stated that, however general the impression might be, he knew of no experiments that tended to prove that impression to be a correct one.

Peter Spence at once determined to make a series of thorough and

conclusive experiments, the results of which were that he proved "that a specimen of cast iron having at 70° Fahr. a given power of resistance to transverse strain, will, on its temperature being reduced to zero, have that power increased by 3 per cent.

One of the discoveries of great scientific interest and practical utility which he made, was communicated by him to the chemical section of the British Association, at Exeter, in August, 1862. He desired to obtain a temperature of 228° Fahr., to extract alumina in the form of sulphate from minerals containing that earth. His apparatus was heated by steam and fire, and he was able to digest for a long period the solutions at the necessary temperature. It happened that, by accident, the fire was neglected and the steam alone operated, nevertheless, to his surprise, he observed the high temperature was preserved; he was led to investigate, and experiment on this phenomenon. Being convinced that the high boiling point of his liquors had something to do with the phenomenon, he selected a solution of a salt (nitrate of soda) having a high boiling point—about 250° Fahr. The nitrate of soda was placed in a vessel surrounded by a jacket; steam was let into the intervening space, until a temperature of nearly 212° Fahr. was obtained; the steam was then shut off, and an open pipe immersed in the solution, and steam from the same source was thrown directly into the liquor; in a few seconds the thermometer slowly, but steadily, moved, and minute after minute progressed until it touched 250° Fahr.

This thoroughly confirmed the results obtained in the digesting vessels and became to the author of immense practical value.

As a corroboration of the theory, which seems to explain the apparent paradox, the author found that the temperatures of his solutions were in the exact ratios of their specific gravities, and had no connexion with the temperature of the steam which never exceeded 212° Fahr. The greater specific gravity of the acid solutions, the higher the boiling-point; and, therefore, whatever the boiling-point of the solution in water of any salt, to that point, or nearly, will steam of 212° Fahr. raise it.

When Peter Spence made this statement it was received with general surprise, amounting almost to incredulity; in fact, Professor Williamson declined to accept the fact, until he had himself seen the experiment performed by Spence, and had personally examined the thermometer. The explanation was then apparent, that the latent heat evolved by the condensing steam had become sensible heat, measurable by the thermometer.

In 1881-2 Peter Spence gave evidence before a House of Commons Committee, on Railway Rates; and his evidence is reprinted in pamphlet form, with the title:—"How the Railway Companies are crippling British Industry and destroying the Canals; with suggestions for reforming the whole system of railway charges and for rescuing the water-ways permanently for the nation."

This pamphlet is still worthy of careful perusal, as it abounds in well-authenticated facts, and contains many valuable and ingenious suggestions. When the scheme of the Manchester Ship Canal was started it had his enthusiastic support, and he was one of those who first subscribed £1,000 towards the needful funds.

Peter Spence never felt that his duties were limited by his business. He never regarded his workmen as mere "hands," destined to toil and poverty, that by their labours the few might rule in affluence and care. He threw his activities into the church in Oxford-road, under the pastoral care of Dr. McLaren, and was elected one of its deacons, in which capacity his intelligence, enterprise, and generosity were most valuable.

It is a pleasure to us to record here an incident that occurred at a very critical period of Peter Spence's business. After the great losses which he incurred by the too hasty alteration of his plant, to work the Redonda Phosphate process, which proved to be a great mistake, he was so crippled financially that there appeared to be no alternative but to liquidate the business, and get it converted into a limited company.

This was a crushing sorrow and disappointment, after the years of persevering industry and successful invention. The wife of his friend and pastor becoming acquainted with the circumstances, privately and totally without Spence's cognisance, mentioned the matter to one of the worthy deacons of the chapel, who at once asked Spence to call on him, and at the interview, inquired what amount would enable him to extricate himself from his difficulties. Spence said it would take five thousand pounds; his friend at once replied, he should instruct his banker to place the amount needed, to his credit. Spence was overwhelmed at the splendid generosity of his brother deacon, and was unspeakably thankful for the unexpected succour thus accorded to him, and which he ever regarded as a most merciful Providence. The prompt and generous aid thus afforded, enabled him to re-arrange works, and revert to his former processes. The months that had brought with them a period of very great prosperity, and the year he was enabled to repay the total sum lent to him. In such days such an incident would, perhaps, be regarded as an unscientific interference with that gospel, so dear to strong men, that the "fittest must survive," the "weak must go to the

by the terrible and wide-spread evils of drunkenness, he

became at an early age an adherent of the great temperance movement, and throughout the remainder of his life was one of its most earnest advocates. He was a teetotaler, a Good Templar, a Blue Ribbon-man, a member of the United Kingdom Alliance, patron of Bands of Hope, and President of the Manchester Temperance Union. Although all these, and similar movements had his hearty support, he was unable to approve of the policy of the Church of England Temperance Society. He believed total abstinence was absolutely necessary in combating the evils of drunkenness, and that temperance reformers made a great mistake in seeking to sanction and secure mere moderate drinking.

He stamped out drunkenness amongst those in his employ, and so secured a staff of sober and industrious men, to whom he proved himself a kind and generous employer.

He was an active member of the Manchester Chamber of Commerce, and a very attentive Justice of the Peace, also a director of the Mechanics' Institution (now the Technical School.) In fact, Peter Spence took a keen interest in all public movements: in politics he was a Radical, in Church polity a Nonconformist; a Parliamentary position was offered him, but this he declined.

Although he inherited a delicate constitution, with a tendency to consumption, yet his habits through life were so temperate, and the measures he took, to preserve his health, so wise, that he enjoyed excellent health, and was, after he had passed threescore years and ten, a picture of happy, bright, vigorous old age. Although short in stature, his appearance was most attractive, there was always a merry twinkle in his eye, and a cheerful, hopeful look on his countenance.

The death of his wife, in February, 1883, was a blow from which he could not rally; without any attack of disease, his strength gradually failed, until on the 5th July, the same year, he passed peacefully to his rest, at the age of seventy-eight.

He was another illustrious example of men, who have climbed the ladder of success from very insignificant beginnings, who have shown that the noblest heritage men can receive, is the inspiring power of sound training and of noble lives, that the diligent and persistent pursuit of knowledge is the way to wealth and honour, and that the man who cares for others has discovered the secret of a happy life.

We conclude this notice with the beautiful words which Dr. McLaren applied to him—"one has gone from us who was as well-known in other circles as in the Church, and was everywhere the same man. Clear and active in intellect, prompt in deed, generous and conscientiously liberal, fervently and always passionately attached to such principles and causes that had won his allegiance, and possessing in a very remarkable manner a force of will, tenacious adherence to his convictions, with large sympathies and warm affections. His devout Christianity was of an unfortunately rare type; his conscientious liberality of rarer type still. To a green old age he kept much of the interest, the vigour, the buoyancy of youth, and he died in peace, calm of mind, and clear of heart, not eager to go, but satisfied with what God had given him, leaving behind him in many a good cause a great blank, and in many of our hearts a green and perpetual memory."

THE WATER IN PARIS.—It is clear that the Parisians will have to bestow serious attention on the question of their supply of water. It has never been of the best, and tourists are well aware that they have always been cautioned to drink as sparingly as possible of it. Now, it seems that the difficulties connected with the supply of fairly potable water are greater than ever. The Vanne Canal, whence the bulk of the water was drawn, has broken down; the scheme to turn on the limpid stream of the Arve in the Eure department has not been carried out; and for the present there is nothing for it but to blend nasty Seine water with that of the springs so as to provide for the needs of the great city.

A NEW ELECTRIC TRAMCAR.—An electric car on the new principle was tried on the Bristol-road tramway route at Birmingham recently with entire success. The car is of the same size as the cars on the Birmingham cable tramway. It is lighted with electricity, and it is to have an electric bell. The motor is in the front bogie, and the accumulators in which the electrical energy is carried are under the seats on both sides. It is expected that one of these cars will be able to run 70 miles with a single charge. This is a full day's work of the present cars. They are, however, only reckoned as half-day service cars, but the whole of the receptacle containing the power driving a car can be taken out at the depot and recharged in the space of five minutes. The present car is the outcome of a recent union of interests between the Julien, the Sprague, and the Electrical Power Storage systems. It has enabled the Central Company to meet the hopes recently expressed that the ultimate form in which electricity might be applied as the motive power of tramways in Birmingham should be the self-contained car and not a separate engine. Until recently the great difficulty in the employment of large cars with self-contained power has been the use of the driving chain, which has been found in practice to be noisy and liable to break. But this difficulty has been quite overcome by an ingenious arrangement which absolutely dispenses with the chain, and which is practically noiseless.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples. On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contribution of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

Correspondence.

ANSWERS TO CORRESPONDENTS.

R. D.—We are not aware of any place where you could procure the desired information.

T. R. R.—Do not invest. If you do you will be sure to lose your money.

MACHINIST.—Water-gas has its uses like everything else; but you should only put it down under good advice.

B. J. C.—The process is being carried on in several parts of the country, and it is believed to be remunerative.

Q. C.—We cannot tell.

JAMES.—There have been so many patents taken out on this subject that we are at a loss how to ascertain which one you require.

SILVERSMITH.—It is quite easy for an analytical chemist to ascertain the composition of the alloy.

JOYAN B.—Your query is only suitable for an advertising column. 2. We have said over and over again we cannot give advice in the matter of forward contracts for chemicals.

D. P.—It is a matter of fact and not mere opinion as you style it.

G. G. R.—We quite agree with you, but there is no one who can stem the tide.

MANUFACTURER.—We have said almost enough on the subject of Railway Rates. We have now lost interest in the matter.

GARRAN.—We are afraid you speak on a subject with which you have not experienced. 2. Re the Patent, try your experiments first, and so save your money.

COFFEE.—We have not the information at hand. Search through the back numbers.

K. K.—Logwood extract and bichromate of potash.

L.—We shall be pleased to receive the article.

F. OWEN.—The carbonisation of coal for bye-products is just a failure or not, as the process is conducted.

* * * We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE SMOKE QUESTION.

To the Editor of the *Chemical Trade Journal*.

SIR,—I notice the remarks made in your leader of last week and beg to say I entirely agree with them. I have now been a very large consumer of coal for more than 20 years, and can say, with every assurance of my being correct, that no black smoke has passed out of my chimneys for more than ten years. This has not been accomplished by the aid of any of the so called smoke preventing appliances, but

simply by having at my command an excess of boiler power over and above our daily or hourly requirements. It is those people who are always pressing their boilers to get as much work out of them as possible that make the black smoke, and for my part I attribute much of the nuisance to the intense desire of many manufacturers to cheapen the cost of production by turning out as much steam as possible in a given space. There is a limit that cannot be exceeded, and herein lies all the difficulty. A 30 ft. x 7 ft. 6 in. Lancashire Boiler, with two separate flues and working at 70 lbs. pressure, can consume, even with careless handling, 25 or 30 tons of fuel per week of 132 hours, without the chimney showing more than a dim haze above it. Increase the quantity of slack to 35 or 40 tons per week, and there will be a light brown smoke, while more than 50 tons are consumed the smoke becomes blacker in hue until at 60 tons per boiler per week there is nothing but a continual volume of black smoke.

I am much surprised to find the Chief Inspector of Alkali Works leading the van in what is called the smoke nuisance agitation. The Alkali Acts have all along specially exempted products of the combustion of coal from the operation of those Acts, and there are many people like myself who think the Inspector should devote a little more attention to those things he was appointed to do, and which anyone with a nose, living within the vicinity of a chemical works, will say are not yet complete, and let those things alone which he cannot do better than anyone else.—I am, &c.,

A MANUFACTURER OF TWENTY YEARS' STANDING.

HOUSEHOLD SMOKE.

To the Editor of the *Chemical Trade Journal*.

SIR,—In your leader of the 28th December you describe the evils of town fogs to be due to household smoke; surely a demonstration of this fact is not necessary. I am a traveller into town by the S. W. Ry. every morning to business, and when coming into Waterloo almost the whole way from Clapham Junction we are over the housetops and can easily observe the vast area of chimneys reeking with domestic coal smoke. Cannot anything be done by modern science to prevent the greater portion of this evil. I know it is a difficult matter, but surely there must be some remedy. I went many times to the Smoke Abatement Exhibition in order to discover how smokeless chimneys may be brought about, but I must say I returned no wiser than I went, and I do not find that the result of that Exhibition has been any the less smoke, or that the world of coal consumers has been enlightened in any way. In my humble opinion these exhibitions and trials are all rubbish, and this is borne out by the barren results of them.

A great deal, if not the whole, of the blame really lies with the property owner or the house builder, fire-grates are not selected as a rule on any account save that of cheapness, and especially is this so with cottage property. Then again, in our mansions it is of no use putting in any arrangement with the slightest trouble attached to it, as the servants complain and out it has to come, the architect being blamed for inserting any such arrangement.—I am, &c.,

AN ARCHITECT.

Our Book Shelf.

THE GAS MANAGER'S HANDBOOK. By Thomas Newbigging, M. I. C. E., Fifth Edition, 524 pp., with 193 figures in the text. London: Walter King, 11, Bolt Court, Fleet Street.

It is very seldom that a Handbook written for any one special branch of industry is of use to many others; this work is an exception to the rule. Written ostensibly for the use of gas engineers and managers, it is a handbook of great importance to every worker in the chemical and allied industries. And the cause of this is not far to seek, gas-making is essentially a chemical operation; in the earlier days of chemistry the worker in the laboratory was seldom illustrated without his retort, and one of the earliest experiments recommended to the tyro in chemistry is the preparation of coal-gas by heating coal in an old tobacco pipe, and storing the gas so produced in a bell jar over water. The chemistry of gas-making has not advanced so rapidly as other industries until within the last few years, but considerable attention is now being paid to it, and when we know that every operation is essentially a chemical one, from the carbonizing of the coal to the measuring of the gas at the station meter, it is not surprising to find the most important gasworks employing chemists of experience. The handbook before us has been very considerably enlarged from former editions and copiously illustrated, and takes the reader not only through the whole series of operations carried on in a gasworks, but treats of the construction of the plant besides; in fact it is now arranged in such a readable form that it will soon find favour and a ready sale amongst many other readers than gas engineers.

The book is up to date with regard to the information contained therein, for we find described good accounts of Generator furnaces, &c.

use of pure oxygen in purification, Claus' process, the Dinsmore process, and others comparatively recent.

Amidst the mass of information of such a useful character, there is a section that should be revised—p. 400—403. Letheby's average composition of London gas, and the comparative illuminating power of other light-giving materials, may have been very interesting before it was discovered that the principal illuminating power was due to benzol vapour; but it is out of date now, and there exists plenty of material for a due correction.

Similarly the relative cost of the magnesium light and coal-gas, which was as 5s. 6d. to 1s. 9d. in 1865, might also be revised with advantage, seeing that magnesium has fallen from 21s. to 2s. 6d. per ounce.

Respecting the relative illuminating power of various materials, as set forth on paper, it is interesting to note the difference between theory and practice. In ordinary use a room is lighted with a 3-light gasalier, each light burning four cubic feet per hour, or for six hours 72 cubic feet; which, at 2s. 6d. per 1,000 cubic feet=2'16 pence, and the occupants say there is only just enough light to see by. Suddenly, through the action of the gas stokers, a duplex lamp is brought into operation; the occupants say the light is as good as with gas, and as only a pint of oil is burned in six hours, costing 8d. per gallon, the light from paraffin oil costs 1d. as against 2'16 pence for gas. The light may not be theoretically as powerful, but practically it is the same, and is sufficient, whereas less than the three burners of the gasalier would not be sufficient.

We do not find any reference in this handbook to the Wenham, Fourness, or other regenerative lamps, at which we are much surprised, seeing that they are in such general use.

The few foregoing remarks must not be taken in terms of disparagement, they relate more to the general aspect of the question than to the work itself. It is a handbook we can confidently recommend to every chemical engineer and manager throughout the world, they will earn a very great deal from it, and though written for the gas industry, is equally applicable to many other branches of the chemical trade.

HANDBOOK OF QUANTITATIVE ANALYSIS, by John Mills and Barker North, 208 pp., and 34 illustrations in the text, 1889. London: Chapman and Hall, Limited.

There are many works on Quantitative Analysis, but the majority of them are not sufficiently clear to be placed in the hands of beginners, especially those who happen to be situated at a distance from teaching centres. The explanation of the preliminary operations of analysis are well though shortly explained in the work before us, and when we look further and find "simple examples in gravimetric analysis," we are quite pleased with the lucidity of description. Chapter III. contains exercises in volumetric analysis, which at one time was sadly neglected in most elementary treatises on practical analysis. The book is one that can be strongly recommended to the student upon first commencing quantitative work, or as explained in the preface, to those entering for Honours at the Chemistry Examinations of the Science and Art Department, and for the Associateship of the Institute of Chemistry.

CATALOGUE of new and second-hand books, English and Foreign, on Chemistry and the Allied Sciences. W. F. Clay, 2, Teviot Place, Edinburgh, 1890.

Mr. Clay, who has established his reputation as a collector and vendor of chemical literature, sends us his catalogue of new and second-hand chemical books, and as it is the only complete list, to our knowledge, published in England, we hasten to advise our readers of its appearance. To those who cull old chemical literature a perusal of the catalogue will be interesting, for there we find such works as Boerhaave's new method of Chemistry, 1753; Dalton's new system of Chemical Philosophy, 1808; Lavoisier's Elements of Chemistry, 1790; Rumford's Essays, 1802; Thomson's system of Chemistry, 1804, and many others equally rare. To those requiring the latest editions the present catalogue will be welcome, as we find it contains C. E. Grove's Chemical Technology, 1889; Watt's New Dictionary of Chemistry, and all others that have been published of recent date. Mr. Clay has a case in our Permanent Chemical Exhibition, so that intending purchasers should call and see specimens of his stock.

INDIA-RUBBER STREETS.—So pleased are they with the caoutchouc pavement laid down, by way of experiment, on a bridge at Hanover, that the corporation of the town has ordered an extension of this kind of pavement over a distance of 1,500 metres. A street in Berlin has been laid in a similar way, and now Hamburg is going to try it. It is as durable as stone, they say, is not slippery like asphalt, and suffers neither from heat nor cold. It is silent we may be sure. Safe for the horse and pleasant for the driver, how will it be with the man on the street? To avoid knocking down pedestrians like nine-pins the horses and vehicles that fly over india-rubber streets must be well provided with warning bells.

THE "WELLS LIGHT."

THERE is no place where the want of a light of considerable intensity is for space illumination felt so much, as in a chemical works. Those who have had charge of processes in the night time will agree with us that night work is never so good as day work and that the reason for this is mainly want of light.

Up to within the last few years the arc lamp in an electric current was the only source of concentrated illumination, if we may except, however, the Siemens high power gas lamp that we have seen in use in one or two establishments. But gas is not everywhere available, and it cannot easily be shifted from place to place as progress of work often demands. The "Wells" light which has now established itself as a practical source of illumination for large open spaces, overcomes all the objections that can be urged against electric light and coal-gas, and the fact that over 2,000 lamps have been sold since their introduction speaks volumes as to their usefulness. Certainly a better source of light for chemical and allied works we have never seen. We were at a chemical works the other night near Manchester where night was turned into day by the aid of a "Wells' Light," which the manager assured us gave no trouble whatever.

To illustrate these remarks we show a small hand lamp of 500 candle power, possessing a cylinder 10 inches in diameter and 16 inches deep, the weight empty is but 40 lbs., and when filled with oil, 70 lbs., and when burning at the above named candle power throws a flame 12 inches long, consuming half-a-gallon of oil per hour.



The principle upon which the lamp acts is by generating vapour from the oil employed, in contradistinction to those lamps driven by continuous supplies of air or steam. This makes the arrangement portable and self-contained. The oil is forced into the cylinder by means of a pump and hosepipe, and compresses the air already in the cylinder to about 20 lbs. to the square inch pressure. In ordinary cases the burner is then heated by the cup and chimney provided with the lamp, and, the valve being opened, the oil is forced up by the air pressure into the heated burner where it is converted into gas, and is there ignited, burning with a large and brilliant flame. The heat of this flame passing through the generating tubes continually converts the ascending oil into gas. In order to increase the facility of lighting a self-lighter has been added, doing away with all smoke, and the need of waste and oil. This apparatus consists of a small oil vessel filled with oil, fitted with a nozzle, and a hook for hanging to the burner, and is connected with a flexible tube to the top of the tank, with a simple "push on" coupling. When air is admitted the blast sprays the oil, and forms a flame that heats the burner sufficiently in about four minutes. When the burner is hot and running well, the lighter is detached, and may be used on another lamp. The old method of heating was undoubtedly a drawback, especially where the lamp was used in the interior of buildings, but all smoke and smell is now obviated.

The "Ship Canal" pattern is, perhaps, the most useful size made, and ranges from 2,000 to 2,500 candle power, using about a gallon

and a half of oil per hour; but a pattern is made yielding 3,000 candle power, with a consumption of two gallons of oil per hour. The tank or cylinder of this size is two feet in diameter, and two feet deep, and is much used where a fixed high light is required, but it is not portable, and is generally employed in conjunction with the semi-fixed arrangements.

One thing necessary to success is to use a good and well-filtered oil. The nozzle of the burner is so small that dirt or grit must be kept out, and the oil must be free from an excess of naphthalene which would also stop the aperture. The lamp has been very much improved in many ways since its introduction, and one very important feature is the supply of separate parts to replace wear and tear, breakages, &c. It is a light that can be placed in the hands of an ordinary labourer, without any fear of its being too complicated for him to understand.

The Paper Makers' Column.

CHEMISTRY IN PAPER MAKING.

DURING the past six months we have endeavoured to make our columns interesting to those paper makers who are not content with rule-of-thumb working. Paper making, if not essentially a chemical process, is one long series of operations wherein chemistry plays an important part at every stage, and he who knows how to conduct his operations on a chemical basis and to trace all faults and errors to their true source, is more likely to succeed than he who tries to cure the disease without being able to diagnose it accurately. Our Prices current will, of course, have enabled the paper maker, amongst others, to follow the markets with reference to his purchases of chemicals, but this is not sufficient for all the details of his business. We therefore decided to devote a column, at least, in each number of the Journal to following up the scheme commenced in our issue of the 20th of July last.

Articles have already appeared on Dyeing paper with quercitron bark; On the economy of pure caustic soda in paper making; Cochineal and its use for tinting paper; Colouring paper pulp with chrome yellow; Esparto; Wood pulp; Aluminous cake; Alumino-ferric cake; Recausticising recovered soda-ash; The influence of iron in sizing materials; Caustic soda lye and how it is tested; Paper makers' caustic lyes; Aluminous mordants for fixing colours on paper pulp; Iron mordants for toning and dyeing paper pulp; Tin mordants for dyeing paper pulp; The strength of caustic soda solutions, and others.

It will thus be seen that there are plenty of subjects that can be culled for the delectation of our readers in the paper trade, as the stock is by no means exhausted, and the before-mentioned articles have been written in as practical a manner as possible, free from all technicalities that could possibly be avoided. We have endeavoured in each one of them to show the why and wherefore of the most important operations of the paper maker, and more than one article has been devoted to the importance of keeping the boiling lyes in the maximum state of purity. It is upon this point we desire to say a few more words.

There was a time when boiling-lyes were only once used, and having taken up their quantum of organic matter were run away as waste. It is pleasant to be able to record the fact that this practice has now become a thing of the past, and it is only in one or two mills where science is completely tabooed, that this unwarrantable waste continues to the detriment alike of our rivers and watercourses, and the manufacturers' pocket. Of course it happens that when the lyes are only once used, they do not vary much in quality, as this depends entirely upon the kind of caustic used for the purpose; but whilst some use every effort to procure the best and highest strength caustic soda or soda-ash the markets produce, others are satisfied with purchasing the dregs or bottoms from the alkali-makers caustic pots, and some paper-makers are foolish enough to believe that an equal bulk of liquor of a certain specific gravity will do as much work whether made from caustic bottoms or from the "Allhusen" brand of high strength caustic soda.

But leaving instances where caustic soda lyes are used once only, for the general practice where the spent lyes are evaporated and calcined, there exists a vast difference in the quality of the recovered liquor from various mills. In some a high degree of purity is kept up while in others degradation is continually going on. We have found in all our observations that when a 70% caustic soda is employed in a mill, and the Porion system of recovery employed that the liquor gradually sinks to the grade of that made up in the first instance from a 60% caustic, and the quality does not further deteriorate. If, however, a 60% caustic is employed to make up the losses in recovery the liquors will gradually go back until they are what we should call unfit for use. When a 77% high strength caustic is employed in a mill or where Bostner Mond's ammonia-soda ash is causticised to make up the loss,

the stock of liquors, when they have attained equilibrium, will be equal to a solution made from 72 per cent. caustic soda.

Many paper-makers place implicit confidence in the tests of the percentage of alkali in the recovered ash, but we beg to point out here that this is not a very good criterion to go by. A 35 per cent. recovered ash may, and often does, give a much better liquor than one testing over 40% as experience has shown over and over again.

For many years now in our laboratory we have discarded the plan of testing recovered soda in the same manner as is employed for soda-ash, and as the process we now use may be of service in the paper-makers laboratory, we give the outline of it here.

First, the sample is roughly ground in an iron mortar, and 100 grms. of the ash placed to digest with 400 c.c. of water at a gentle heat. The settled solution is then poured through a coarse filter, and the residue treated with successive portions of hot water until the whole of the filtrate is brought to 20° Tw. The filtrate is then allowed to cool to 60° F. (15° 5°C.) made exactly to 20° Tw., and carefully measured. This gives us a relative test of the quantity of liquor yielded by any kind of ash. Now in order to test the quality of the ash it is far better to judge by inference from an examination of the 20° Tw. liquor produced as already described. Certain quantities can be pipetted off, and the quantities of the various constituents determined. The following analyses have been done by this method, and show extreme conditions which cannot be good for the manufacture:—

No.	C.C. of 20° Tw. liquor from 100 grms. of ash.	% of Insoluble residue.	Grms. per litre in 20° Tw. liquor.				
			Alkali.	Sulphate.	Sulphate after Oxid.	Sodium Chloride.	Silica.
1	698	30.0	40.0	10.5	26.5	14.8	7.1
2	862	12.0	37.7	24.6	25.3	10.6	12.2
3	910	1.2	48.0	7.2	7.6	6.7	10.4
4	700	15.3	50.0	3.1	3.9	9.0	1.9
5	940	11.5	44.0	5.6	6.1	4.9	26.9

Another point worth mentioning in this connection is the mode of treating recovered ash. Some manufacturers draw the ash from the calciner in a green or flaming condition and wheel it straightway into "dens" to "burn off." This is by no means necessary, nay, it is even injurious to the quality of the liquors, as we have always found that there is far more silica in liquors made from "burned off" ash, than from that vatted in the green state.

On the other hand, it is injurious both to the quality of the ash and to the life of the furnace, to carry the calcination process too far. If carried to incipient fusion, the alumina of the brick lining is strongly attacked, and this alumina subsequently causes a loss of soda. The foregoing statements are not mere opinions, they are inferences drawn from the results of many analyses made in our laboratory from samples received from many forms of evaporators; the arguments hold good for all forms.

BLEACHING POWDER.

THE recent collapse of all agreements and conventions connected with the various products of the alkali trade has naturally caused much attention to be paid to bleaching powder. In years gone by, and not many years either, bleach has been sold at £3. 15s. per ton; and in the absence of all conventions, and with manufacturers striving to turn out all their plant will possibly produce, there are many consumers expecting a return to the foregoing low price. Our readers may possibly expect us to say something upon the subject in this our New Year's number, so that it would be as well to review the various processes that have passed before the showman's pointer. Few outsiders have properly grasped the changes brought about by modern chlorine processes. It has often been urged, by those who are only partially acquainted with manufacturing details, that the manganese process resulted in producing a greater weight of bleaching powder from a ton of salt than was the general rule before. This was brought about by better condensation. The manufacture of hydrochloric acid is now quite a different matter to what it was twenty years ago, when wash towers were to be found sending acid away into the drains at 10° and 12° Tw. as unfit for use.

This is clearly shown from some figures culled from an old manufacturing record of 1871. In this work, which shall be nameless, the decomposition of 1,220 tons of salt produced 194 tons of bleaching powder of 36% strength, or about 6 tons of salt being consumed per ton of bleach made. That the acid was really being wasted in the wash towers may be seen from the fact that the manganese stills were charged with 600 lbs. of 70% manganese each, and 50 cubic feet of acid testing 25% of real H Cl, ten of these stills used regularly to produce a chamber of 36% bleaching powder, weighing on an average

three months exactly four tons. This means 14 cwt. of 70% manganese and four tons of liquid muriatic acid at 28° Tw. per ton of bleach of a ton of bleach from about 45 cwt. of salt. This amount was not for many years reached by the Weldon process. In 1876 the general consumption of salt per ton of bleach was 60 cwt., and it was considered extremely good working if ever 55 cwt. was reached. How then did the Weldon process aid the manufacturer? Simply by cheapening his manganese, for whilst at the present time the native manganese necessary for a ton of bleach would cost at least £2. 8s., the Weldon manganese costs but the odd eight shillings. Even up to 1884 a great deal of acid was lost as free acid in the still liquors, and in that year, or the year before, Mr. George E. Davis read, before the Manchester section of the Society of Chemical Industry, a paper, the results of some experiments carried out in 1875, with a view of utilising this acid and making it into bleach. Like most other improvements the paper was attacked by men who should have known better; they used all their arts and wiles to prove the impossibility of attempting such a thing, but the proper answer is that the process is being employed in the year of Grace 1890, with the result of making a ton of bleach from 45 cwt. of salt, a quantity equal to that used in the old native stills. Mr. Davis found in practice the free acid in the still liquor was equivalent to the "base" of the Weldon mud, and based his process on this information.

In 1873 the bleaching powder made by the Weldon process was supposed to cost as follows, and the second column exhibits the cost to-day:—

	1879.	1890.
	£ s. d.	£ s. d.
Coal	0 6 10	0 6 0
Lime	1 1 4	0 14 0
Limestone ..	0 3 3	0 1 0
Manganese ..	0 8 1	0 4 2
Wages	0 17 8	0 13 4
Casks	0 17 1	0 13 0
	3 14 3	2 11 6

Nothing is here reckoned for the cost of the muriatic acid of which, as already seen, four tons are required, neither is there anything set down for repairs or depreciation.

The necessary hydrochloric acid at sixpence per carboy, comes to £2. per ton on the bleach, so that with bleach at £5. free on rails at makers' works, there is not much profit for the manufacturer, and if prices continue at this low level, there will be not a few balance sheets that will look ugly at this time next year. To the foregoing costs of production must be added:—

	s. d.
Depreciation at 10%	5 0
Repairs	4 3
Material for Repairs and General Expenses ..	6 8
	15 11

so that it will be seen the manufacturer does not net sixpence per bottle or his acid. With the cost price of bleach at £5. made up as follows:

	s. d.
Coal	6 0
Lime	14 0
Limestone dust	1 0
Manganese	4 2
Wages	13 4
Casks	13 0
Depreciation	5 0
Repairs	4 3
General Expenses, &c. ..	6 8
Acid (4 tons)	1 12 7
	£5 0 0

Four tons of acid at £1. 12s. 7d. is fourpence and thirteen-twentieths of a penny per carboy.

But there are other processes by which bleaching powder is being manufactured, Deacon's classic process introduced in 1871 is still at work in several places, and if it had been properly pushed and worked it might have produced a ton of bleach from a ton of salt. But it has not yet done so. We believe no accurate working figures have ever been published in this country in connection with this process, which has always seemed under a cloud from its very initiation. In actual practice it has only been found convenient to decompose the gas coming from the pot; we cannot theorise on what might have been done, or at least attempted, we must stick to actual facts. If we take it that 75 per cent. of the total gas evolved from salt is sent away from the pot, we shall not be far from the truth. The average decomposition, in practice, that we have found, is 60%; $75 \times 0.6 = 45$ per cent.; of

which about five is lost in the wash towers, &c., leaving, say 40 for conversion into bleach. At this rate a ton of bleach would be made from 30 cwt. of salt.

We have often wondered why those manufacturers who have this process in use have not endeavoured ere this to strengthen up their weak acid, and to dehydrate it for further use in the process. Two processes were at use in Manchester in 1877, which might profitably be employed in the Deacon process for the preparation of substantially dry muriatic acid gas, and by this means it would be possible to make a ton of bleaching powder for every ton of salt decomposed. We believe some such process has been worked by Hasenclever on the Continent, and by Solway in his experimental works, and that they have found it successful. When liquid muriatic acid is mixed either with strong sulphuric acid or a saturated solution of chloride of calcium, or with solid chloride of calcium, magnesium or zinc chlorides, the water stays with the deliquescent salts, while the acid gas escapes. The present arrangement of acid making towers, wash towers, weak acid towers, and so forth, would remain almost unchanged, it would only be necessary to concentrate the deliquescent material from time to time as it became too weak for evolving gas.

But we have to deal with practical results that have been attained on the manufacturing scale. We believe the most successful run on the Deacon process, for any length of time, has been when the salt-cake pot, working 30 tons of salt per week of 132 hours, has turned out 21 tons of bleach per week, with a consumption of 23 cwt. of copper scales per 1,000 tons of bleach produced, and the cost of production may be accurately stated as follows:—

	£ s. d.
Labour	0 15 1
Fuel, at 6s.	0 2 8
Lime	0 7 0
Copper scales	0 1 2
Casks	0 13 0
Repairs	0 4 0
Depreciation	1 13 4
General expenses	0 13 4
Acid	0 10 5
	£5 0 0

One item deserves explanation, and that is "Depreciation." In the Weldon process this amounts to 5s. per ton, but in the Deacon to 33s. 4d. We base our figures on the cost of a plant erected to take the gas from one pot and furnace, and the longest run it ever had was one of 37 weeks, during which time 588 tons of bleach were made in it. This plant cost £13,000, whereas a Weldon plant, to produce 100 tons of bleach weekly, would cost but £12,000.

But in this cost sheet of the Deacon process it must not be forgotten that nearly 60 per cent. of the acid is turned into another channel. In the Weldon process all is used up, so that where a weak acid can be utilised there is no great difference between the two methods financially, the more especially as a Deacon plant to do 15 tons of bleach per week could be put up to-day for less than £13,000. Herein lies the solution of the riddle thrown out in an early number of this journal, the production of a ton of bleach from a ton of salt; but science moves very rapidly now-a-days, and this ratio has been largely exceeded, the next problem we shall attempt to unfold to our readers, in a few weeks time, is a ton and a half of bleach from a ton of salt, with a comparatively inexpensive plant, one simple and easy to work, requiring the minimum of labour, and free from liability to escapes of gas, so frequent under existing systems.

THE LAMP TRADE.—The Central News says:—In consequence of the strikes and agitation in the gas trade in London and the provinces, there has been an enormous demand for lamps, especially of the cheaper kind. Many of the large wholesale houses have been cleared of their stocks, and an extremely good business is being done in lamp glasses. Although the stock in the hands of retailers is still very large, the shopkeepers have been for some days past laying in large stocks of petroleum, oil, and candles, and householders appear to have been buying largely of the latter. Strange to say, however, tallow in the market has not been affected to any appreciable extent, for prices at the last sales were practically unchanged save for an occasional 3d. to 6d. drop. A similar phenomenon is observable in the petroleum market. Retailers have been largely increasing their stocks, but the wholesale market is flat, and within the last few days petroleum has declined a farthing per gallon, and Russian is one-eighth of a penny lower. Colza is firm, owing to natural causes, and other oils are not affected. Coals, however, have shown much movement. Best coals, which at the end of November were quoted on the exchange at 19s., are now 21s. 6d. per ton; and seconds, which were 18s. have been run up to 20s. 6d. Many firms are now retailing house coals at 28s. per ton.

*See Chemical Trade Journal, Vol. 1, p. 132.

THE DINSMORE PROCESS AND ITS PROBABLE EFFECT ON THE BENZOLE MARKET.

THE Dinsmore process of gas making, with material modifications, patented by Mr. Isaac Carr, is now receiving the careful attention of gas engineers, and there is no doubt we shall see it introduced into many works. How much patent there is about the whole thing is a matter which no doubt will have to be decided before long, seeing that many specifications have been published for the destructive distillations of tar, and to our own knowledge at least one patent claims the super-heating of the gas after leaving the primary retort and before its entry into the hydraulic main. It was the offer of this process by the patentee which induced the writer to enter into a series of experiments, some results of which were read before the Society of Chemical Industry (London Section) in 1885. It has never been denied to our knowledge that a gas of good illuminating power could be obtained by the destructive distillation of ordinary gas tar, but no one, before the date of the experiments alluded to, had attempted to satisfy himself which of the constituents of the tar yielded the illuminants and which the diluents, or how much gas could be produced of a certain illuminating power, from a given weight of various tar products. Shortly after this paper was read, Mr. Lewis T. Wright, then gas engineer to the Nottingham Corporation, attempted to show the absurdity of attempting to enrich gas by the aid of tar products, but his experiments were faulty, his inferences incorrect and his logic bad, and, moreover, his paper exhibited the fact that he must have been unacquainted at that date with the experiments that had been made at the works of the Paris Gas Company, and which we have now published in these columns.

In the paper to be found in the J. S. Ch. Ind., January, 1886, when treating of the gasification of tar, the following paragraph appears:—"Supposing for a moment that these crude attempts, and others of a similar nature which followed them, had been successful in the matter of gas-making, pure and simple, it is doubtful how far they would have conducted to the enrichment of the gas, as I have found by experiment that the pitch which constitutes about three-fifths of the total weight of the tar produces a gas absolutely devoid of illuminating power, in quantity about 25 per cent. of its weight."

And again:—"To attempt the carburization of gas by employing any compound of the benzene series seems to me the height of absurdity, seeing that it is from coal-tar that these products are produced, and the cost of extraction must be added to the original cost of the tar. If these compounds are to be used at all, it is the crude tar which should be operated upon in the gasworks, the tar being made to replace cannel."

Experiments were made by the reader of the paper, from which it was argued that the seven tons of tar produced from 100 tons of coal is of value to the gas maker, equal to nearly ten tons of cannel coal, and there would be produced besides, pitch and anthracene, which would yield a very respectable revenue. In the experiments cited, ordinary coal gave 10,000 cubic feet of 17 candle gas, or in all 170,000 candles. This is perhaps above the average for ordinary coal, and 160,000 candles is nearer the mark. The tar oils operated upon gave 16,000 cubic feet of 50 candle gas per ton, or a total of 800,000 candles per ton, so that a ton of tar oils for this purpose would be five times the value of a ton of ordinary coal. This is exactly what the ratio is to-day, when coal is at 9s. per ton, and oils at 3d. per gallon.

Mr. Carr has read a very interesting paper before the Manchester District Association of Gas Engineers, and in it gave the result of an eight weeks trial of the Dinsmore process while using Abram Arley mine slack, in which 130 tons of coal produced 1,545,000 cubic feet of 21.32 candle gas, without the use of a particle of cannel. These results are much in excess of those obtained by the writer when working in a somewhat different way, but if they can be repeated the process has a great future before it, and must in time become generally adopted.

And now we may turn our attention to another phase of the question; the Dinsmore tar will be entirely denuded of its benzol, toluol and xylol, the carbolic acid and light creosote oils; of what value will it be to the tar distiller? Practice can only answer the question properly. It may be that the tar will be so thick as not to run through pipes in the cold weather, if so what is to become of it? Perhaps it will in such a case be burned in the works wherein it is produced. If this be so then the anthracene and pitch will go as well into thin air. From whence then will the colour-makers procure the raw material?

It must be remembered that the make of benzol from coal-tar has not increased in late years in proportion to the coal carbonised; higher heats have been employed in gas works, yielding more gas per ton; that this poor gas has robbed the tar of a portion of its lighter products; no one knows this better than the modern tar distiller. At the present time about two millions of gallons of benzol are annually produced from gas-tar, so that if the Dinsmore process becomes general, this quantity must be made up by new carbonising works. The year 1890 will most probably see about 385,000 gallons of 90% benzol turned

out from the carbonising works of millions of gallons procured from or

The Dinsmore process is then an tar-distiller, quite as much as that of only sell their surplus tar, so that it is the wording of their contracts, and article that may be next to worthless should endeavour to act honestly in illuminating power from the tar, this endeavour to persuade themselves or good as before.

We shall await with great interest are to be conducted at the Liverpool results as Mr. Carr has obtained at V system all over England is certain, are prepared we may have a return astonished the world in 1883. Do cycles? If so, 1890 may not be an not oversold themselves.

TENSILE TESTS AT VARYING TEMPERATURES.

M. ANDRE le Chatelier has recently made experiments on the tensile strengths of various metals. The specimens tested were annealed and heated in an air bath. The results obtainable, the figures being the breaking stress in pounds per square inch:—

	Temperature	
	15 deg.	100 deg.
Copper	16.0	14.5
Aluminum	11.7	9.5
Nickel	35.0	35.0
Silver	10.9	10.1
Aluminum bronze	33.8	33.3
Copper, iron, nickel	26.9	26.8
Zinc	7.9	1.5

THE PATENT OFFICE.

"EXPERTS?" said a prominent person recently. "Why, they are as numerous as the stars in summer, and you can hardly enter a room without meeting one or more. The work here is embracing has it does the entire domain of science, unless the men who decide upon the necessity of thousands of applications for patents, who do not thoroughly understand the state of the art, are crowded with the cases of litigious inventors."

Many of the examiners in the different departments are learning. Especially is this true of the applications are out of the usual run, such as the telephone and electric lighting. The experts who are called upon to examine the inventions of Edison and others, in regard to new electrical devices, are men who thoroughly understand the principles of electricity, and there is no doubt that they are not thoroughly familiar with the details of the inventions. There is no examiner is busy in the laboratory.

But the experts of this office are by no means ignorant of the divisions of electricity and chemistry. They are treated of here, and the examiners must, of course, be thoroughly familiar with their subjects.

The inventive faculties of the country set at present the subject of naval projectiles attracts attention at their hands. This requires that their claims should know his business thoroughly.

Mr. P. B. Pierce, who has charge of the examination of claims for sewing machines, is another man who can be considered an expert in his line. He is a man who has spent a life study of the subject.

And so it is throughout the office. Every man has his particular line, and some of their particular lines are so difficult to fill. The pay of these men is not high, but they are so wrapped up in it as to be able to deal more out of the office as an attorney, for this is, nobody seems to know, unless it is in the case of the other interests for the sake of the opportunity which their position so abundantly gives them.

A STUDY OF COAL GAS,

By M. EM. SAINTE-CLAIRE DEVILLE.

(Engineer at the experimental works of the Paris Company.)
(Continued from 337, vol. v.)

The following are the averages of the results obtained, the extreme limits of variations being given in each case:—

1. Gas entirely deprived of benzene, but still containing 4.4 litres of non-aromatic hydrocarbons per 100 litres.

The gas burner was placed at one metre and the standard light at 1.40 metres from the photometric screen.

The amount of gas burned varied from 133-151 litres (mean 141.9 litres).

From this it follows:—

Illuminating power (volume per unit standard light) 293.7 litres, or illuminating power of the gas per 100 litres per hour, 0.334 candles. This makes 0.076 candles per 1% of olefines and acetylenes, or 0.056 per gramme of these same hydrocarbons.

2. Gas cooled to 22°; that is the formed gas entering in addition 23.151 grms. of benzenes (92% of which is pure benzene) per cubic metre, or 2.315 grms. per 100 litres.

This gas burnt at a Bengel burner placed at one metre from the screen, at the rate of 124.4 litres (limits 150-127) gives the same light as a standard candle, at the same distance. The number 124.4, therefore expresses the effective volume per standard candle. Intensity per 100 litres of gas burnt is then 0.804 candles, i.e. 0.470 candles more than the former gas.

We may therefore say that the 2.315 grms. of benzene have supplied the illuminating power corresponding to 0.470 candles, or 0.203 candles per grm. of benzene.

3. Ordinary gas. That is to say the second sample, containing in addition 16.245 grms. of benzenes (52% of which is pure benzene), per cubic metre, or 1.624 grms. per 100 litres. This gas burnt at one metre from the screen at the rate of 104.6 litres (limits 103-107) gives a light equal to that of a standard candle at the same distance.

Its illuminating power per 100 litres of gas is, therefore, 0.956 candles, i.e., 0.152 more than the preceding.

The additional 1.624 grms. of benzene have, therefore, increased the illuminating power by 0.152 candles, or 0.093 per gramme of benzene.

We have, therefore, for the analysis of the illuminating power of our ordinary gas per 100 litres:

(1.) 0.334 candles due to 4.4 litres, or approximately 6 grammes of various hydrocarbons, making 0.076 candles per litre, or 0.056 per grm. of these.

(2.) 0.470 candles due to 2.315 grms. of benzene, containing 92% of pure benzene, or 0.203 per gramme.

(3.) 0.152 candles due to 1.624 grms. of benzene containing 52% of pure benzene, or 0.093 per grm.

These give a total of 0.622 candles produced by 3.939 grms. of benzene containing 77% of pure benzene, or 0.157 per gramme.

The total illuminating power must, therefore, be appointed in the following manner:

Due to various hydrocarbons	34.9	34.9
„ 92% benzene ..	49.2	65.1
„ 52% „ ..	15.9	
	100.0	100.0

Experiments made since the printing of this article, show that the three 3.4% of ethylene present in coal-gas do not contribute more than 10-13% (i.e. 3.25% per 1% of ethylene) to the illuminating power. About 22.25% of the illuminating power, therefore, remains to be accounted for by acetylene and propylene. In view of this result, it necessary to fall in with the opinion held by Lewis T. Wright and Percy Frankland, who maintain that Marsh gas and its homologues play a much more important part than is usually believed. The following table is borrowed from the report of the 23rd November, 1886 (No. 229), in which are given the results of experiments on the influence of carbonic acid, several other gases and ethylene on the illuminating power of coal-gas. The table shows the probable share of each class of hydrocarbons in the production of 100 units of light.

	Rich Gas Types III. IV. & V.	Poor Gas. I. & II.	Average Gas.
Benzene			
(Aromatic series)	40-50	70-85	65
Other hydrocarbons			
Absorbable by bromine ..	30-15	15-7	10-20
Ethylene, propylene & acetylene			
Marsh Gas	12-10	10-8	10
Higher members of Marsh Gas series	18-25	5-0	15.5

THE ILLUMINATING POWER OF A GAS DOES NOT INCREASE IN PROPORTION TO ITS RICHNESS.

A superficial examination of these numbers might lead to the conclusion that pure benzene has a much greater illuminating power than an equal weight of the other hydrocarbons of the series.

1 grm. of benzene gives (92% of pure benzene), 0.203 candles.

1 „ „ „ (52% „ „ „), 0.093 „
or less than half.

This effect would, to some extent, be expected, for benzene is richer in carbon than the other hydrocarbons of the series. I am, however, convinced that the enormous difference which we have shown to exist between the illuminating power due to the benzene condensed between 22° and 70°, and that due to benzene condensed at 22°, is due to another more important cause.

It appears very probable that the luminosity of one gramme of a hydrocarbon varies considerably with the richness of the gas in which it is contained, and with which it is burnt.

The addition of one gramme of benzene to a poor gas, that is to say, produces a much greater increase in its illuminating power than the addition of the same amount to a gas already rich.

It must, however, be borne in mind that this variation in the specific luminosity of a hydrocarbon may perhaps only be apparent, and that it will not be shown, or only in a less degree if each gas be tested under the most favourable conditions, that is, with a burner adapted to its composition, as the Bengel burner is to the average composition of Paris gas.

Whatever may be the correct interpretation of the above figures, from the point of view of the theory of combustion, they suffice to enable us to answer the following question:

What is, measured under the usual conditions of the city of Paris, the increase in illuminating power which can be expected if, by the application of the process known as "hot condensation," or by any other means, it becomes possible to retain in the gas, all or part of the benzene which is now found dissolved in the tar?

This addition would mean continuing the series of successive enrichments of the gas which we have already considered.

We have seen that, setting out with gas entirely freed from benzene, the addition of 2.315 grms. of this hydrocarbon to 100 litres of gas, produced an improvement of 0.203 candles per gramme, and that a further addition of 1.524 grms. only produces an improvement of 0.003 candles per gramme.

It is obvious that a third addition would make still less improvement, and that in estimating it at 0.08 candles per gramme of benzene added to 100 litres of gas, we are well within the truth.

Now, all the benzene contained in the tar would not enrich the gas by more than 2.9 grms. per cubic metre, as we have already seen, which amounts to 0.29 grms. per 100 litres.

The extreme limit of enrichment of the gas, which can never be actually attained, is, therefore,

$$0.08 \times 0.29 = 0.023 \text{ candles.}$$

In short, the benzene left in the tar represents less than 2 per cent. of the illuminating power of the gas, and is, therefore, not worth retaining in the gas. (It must be remembered that this applies to the average gas of the Parisian Company, in the works of which 65-70% of the tar is condensed hot, both in the syphons and collector. Such are the facts as to the part played by benzene in average gas.)

Other investigations have also been made, the gas being drawn directly from the retort and condensed, etc., by means of laboratory apparatus, so arranged as to avoid the formation of a stock of tar such as accumulates in the coke columns of the scrubbers. The experiments were not continued long, owing to the trouble caused by them in the retort houses.

The results are expressed in the accompanying table, the numbers in which represent the amount of benzene in the gas, the position of the figures showing the period of the distillation at which it was collected.

Weight of benzene in grammes, per cubic metre of gas:—

Age of charge	1	2	3	4	5	6	7
4th hour	25.300	24.008	25.166	—	24.833	—	—
	—	—	—	24.250	—	31.875	—
	—	—	—	31.147	27.000	—	27.700
3rd hour	35.086	30.886	34.029	—	—	39.017	—
	—	—	—	37.184	—	—	31.953
2nd hour	34.075	33.935	42.300	—	29.100	39.125	—
	—	—	—	39.808	—	—	41.592
	—	—	—	32.798	—	37.100	—
1st hour	25.278	28.806	28.444	—	36.815	34.700	39.086
	—	—	—	—	—	—	40.205
	—	—	—	—	—	28.642	—

It appears from these numbers that benzene is present in moderate quantity at the commencement of the distillation, and that its quantity increases gradually to a maximum at the end of 30 or 45 minutes, this being maintained until the distillation is half over. It then slowly decreases till the close of the operation.

These results admit of easy explanation by Berthelot's theory, that benzene is one of the chief products formed when a mixture of hydrocarbons is submitted to a high temperature.

(To be continued.)

Market Reports.

THE LIVERPOOL COLOUR MARKET.

COLOURS are unaltered. Ochres: Oxfordshire quoted at £10. £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £22. 10s. Red lead, £19. 10s. Oxide of zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

TAR AND AMMONIA PRODUCTS.

TUESDAY.

The holiday season has not been without its effect upon the tar products market, but so far only as regards the demand, values have not suffered to any degree, nor from what we can see are they likely to if producers will be circumspect. Benzoles may be quoted at old rates, 3s. 5d. for 90's and 2s. 7d. for 50/90's; solvent naphtha and carbolic acid as before. Creosote of good quality for lighting purposes has risen a halfpenny, and good fluid makes are difficult to purchase ahead. Anthracenes are very firm, and rates already quoted are applicable to-day. Pitch is still in good demand, and 32s. Garston and 34s. at East Coast ports is the ruling figure.

The sulphate of ammonia market is quiet on account of the holidays, and though buyers are not disposed to pay the values now asked by the sellers, yet it is the general opinion that the highest figures paid before Christmas will be again reached as soon as the New Year is well in. To-day's prices may be quoted as £12. 5s. Hull and Leith, London £12. 6s. 3d. to £12. 7s. 6d., while Beckton is variously spoken of at both these latter prices. There is not much sulphate offering, so that producers need not feel any alarm at business being a little less brisk during Christmas week and the New Year. The year 1890 commences better than 1889, and there is no reason why prices should not be maintained.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

This afternoon the Scotch works close for the New Year's holiday, and some of them will not resume till Monday. The feeling for fully a week has been more lively, and the New Year is to begin with a larger share of immediate promise in it for the chemical industry than could have been expected two or three weeks ago. Bleaching powder and soda crystals appear to have called a halt from the late downward run, and there has even been a recovery—very partial, however, as yet. Caustics have further gained. Lubricating oil retains advantage recently acquired. Perhaps sulphate of ammonia is scarcely so strong, but the shrinkage is trifling. The article is on offer to-day at £12. 5s., that price, however, being at the moment just in excess of buyers' views, and true Leith figures therefore must be stated at £12. 3s. 9d. to £12. 5s. Bichromate of prash and bichromate of soda have been moving off in moderate parcels to the Continent farther into the winter season than usual, owing to the persistent openness of the temperature, and consequent postponed closing of North Sea ports. In other respects the demand for these articles is not up to the average, and works could do with bigger order lists. Chief prices current are:—Soda crystals, 42s. 0d. net Tyne; alum in lump, £4. 17s. 6d., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 48/52, 1¼d. less 5% Tyne; caustic soda, white

76°, £9. 70/72°, £7. 7s. 6d., 60/62°, £ less 2½% Liverpool; bicarbonate of casks, £5. 5s. net Tyne; refined Tyne; saltcake, 26s. to 28s.; bleach less 5% f.o.r. Glasgow; bichromate less 5 and 6% to Scotch and English potash, 4½d., less 5% any port; nit sulphate of ammonia, £12. 3s. 9d. to 1st and 2nd white, £36. and £34., less £23. 10s., less 5% Liverpool; paraffin wax, 120°, semi-refined, 2½d paraffin oil (burning), 6¾d. to 7d., 865°, £5. to £5. 10s.; 885°, £5. £7. to £7. 10s. Week's imports c cargoes.

MISCELLANEOUS CH

In all branches of the chemical trade tendency to higher prices, and prospect fairly encouraging. In the alkali trade in values during the past week, but firmly held by makers for future deliveries is the current quotation, but for 1 ding to make. Caustic soda, £7. 5s. for prompt and forward at 25s. per 4½d. to 4¾d. per lb. Sulphate of being done at £23. Acetates of lime good demand. Acetic acids are incl material. Other acetates without move prices unchanged. Acetic still maintain both for home and export trade. Anilin is a fair amount of enquiry. Prussiates the spot, but the high price quoted for forward business being done. Vitriol st for all purposes.

THE LIVERPOOL MINI

Notwithstanding the holidays and the year a good business has been done. Manganese: Arrivals have increased, but prices continue strong. Magnesite: prices in buyers' favour; raw ground, £10. to £11. Bauxite (Irish Hill Brand) that the supply is scarcely able to keep firm—lump, 20s; seconds, 16s; thirds, 17s. 6d. per ton at the mine; arrivals continue to have been large, but prices have been full G.G.B. "Angel-White" brand—90s. to superfine. Barytes (carbonate) steady; second, £6.; No. 1 lumps, 90s.; best, 80s.; second 50s.; best ground, £6., and selected cry unchanged; best lump, 35s. 6d.; good 6d. to 27s. 6d.; common, 18s. 6d. to 20s. brand, 60s.; common, 45s.; grey, 32s. unchanged, ground at £10., and especially quality, £13. Iron ore is brisk. Bilbao to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d. Purple ore continues scarce at last quotation in strong demand at 27s. 6d. for 20 per brands in good demand, and bring full price at £5. 10s. to £6. and smalls, £5. to £5. 45s. to 50s. for best blue and yellow; fine Scheelite, wolfram, tungstate of soda, as inquired for. Chrome metal, 5s. 6d. per lb. Chrome ore, best qualities are sought after and antimony metal firm. Uranium ore Best rock £17. to £18.; brown grades, ore dearer; Small £12. to £13.; see Calamine: Best qualities scarce—60s. sulphate (celestine) steady, 16s. 6d. to 17 to £16.; powered (manufactured), £11. 1 manufactured, old G.G.B. brand brings English. Plumbago: More offering; best tions; Italian and Bohemian, £4. to £22. cargoes, scarce on spot—20s. to 22. 6d. scarce, especially high brands. Ground m offering—common, 18s. 6d.; good medium to 35s. (at Runcorn.)

New Companies.

BENGAL INDIGO MANUFACTURING COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £150,000, in £10. shares, to carry on business as indigo planters, and manufacturers of, and dealers in indigo, and also as farmers, graziers, growers, manufacturers, and dealers in all kinds of tropical products. The subscribers are:—

W. E. Medland, Withington, near Manchester, merchant and manufacturer 1
M. A. Herrman, Hamburg, merchant 1
E. C. Schreyer, Dresden 1
J. Leigh, Knutsford 1
S. Mosley, 104, King-street, Manchester, chartered accountant 1
J. B. Lonsdale, 9, Fennel-street, Manchester, merchant 1
J. W. Radcliffe, Werneth-park, Oldham, merchant, &c. 1
F. Karuth, 58, Perham-road, West Kensington 1

DAVID MARTINEAU AND SONS, LIMITED.—This company was registered on the 12th inst., with a capital of £250,000, in £10. shares, to acquire as a going concern the business of David Martineau and Sons, of Christian-street, sugar refiners. The subscribers are:—

David Martineau, 21, Mincing-lane, sugar refiner 1
G. Martineau, 21, Mincing-lane, sugar refiner 1
W. S. Hodgson, Esher, Surrey 1
C. H. Gill, Staines, sugar refiner 1
E. S. Hobson, 21, Mincing-lane, clerk 1
R. W. Brown, 47, Kirkstall-road, Streatham-hill, clerk 1
C. F. Worters, 125, Sunderland-road, Forest-hill 1

WITTY AND WYATT, LIMITED.—This company was registered on the 12th inst., with a capital of £30,000, in £1. shares, to manufacture and deal in asbestos andbestos goods, and to enter into an agreement with Messrs. Witty and Wyatt. The subscribers are:—

H. H. Witty, 88, Leadenhall-street, merchant 7,499
R. C. Wyatt, 88, Leadenhall-street, merchant 7,499
Torre Diaz, 41, Moorgate-street, merchant 7,500
J. M. de Zulueta, 41, Moorgate-street, merchant 7,499
P. Pate, 88, Leadenhall-street, secretary to a company 1
F. H. Lovegrove, 88, Leadenhall-street, clerk 1
J. T. Hancock, 13, Godwin-road, Forest-gate, secretary to a company 1

ENGLISH PORTLAND CEMENT COMPANY, LIMITED.—This company was registered on the 18th inst., with a capital of £25,000, in £1. shares, to manufacture cement and similar substances, and to adopt an agreement with Messrs. Irwin, Popper, and Co. The subscribers are:—

R. Morris, J.P., Doncaster 500
Mrs. G. Morris, Doncaster 120
Miss H. E. Morris, Doncaster 10
Miss M. Morris, Doncaster 10
Mrs. M. A. Morris, Doncaster 100
W. R. Morris, Doncaster, merchant 250
Miss C. Woodhouse, Doncaster 10

KUHN PATENT PASTEURIZATION SYNDICATE, LIMITED.—This syndicate was registered on the 16th inst., with a capital of £20,000, in £1. shares, to acquire the patent rights of Wm. Kuhn, relating to the Pasteurization of beer, wines, and other liquids. The subscribers are:—

E. W. Owles, 14, Ordnance-road, St. John's Wood, clerk 1
A. E. Pridmore, 2, Broad-street-buildings, architect 1
T. J. Sturgeon, Broad-street-buildings, commission agent 1
O. Verne, 10, New Broad-street, solicitor 1
J. Wakefield, 4, Keppel-street, Russell-square, commission agent 1
J. M. Sharp, 1, Finsbury-square, solicitor 1
R. J. Jeffes, 4, Westbourne-terrace, Lower Clapton, clerk 1

HEATHLEY, JANISCH, AND COMPANY, LIMITED.—This company was registered on the 14th inst., with a capital of £3,000, in £1. shares, to trade as chemists, ruggists, and dealers in proprietary articles, and in all kinds of electrical and scientific apparatus. The subscribers are:—

J. Heathley, Blyth, grocer 1
G. A. Heathley, Newcastle-on-Tyne, chemist's assistant 1

Ralph Carr, Newcastle-on-Tyne, insurance agent 1
W. Turnbull, Newcastle-on-Tyne, draper 1
Mrs. Turnbull, Newcastle-on-Tyne 1
Mrs. E. Janisch, Newcastle-on-Tyne 1
E. Towers, Tynemouth, accountant 1

AUDENSHAW PAINT AND COLOUR COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £11,000, in £1. shares, to acquire the business of the Audenshaw Paint and Colour Co., at Palatine Works, Guide-lane, Guide-bridge, near Manchester, and at 11, Great Ducie-street, Strangeways, Manchester. The subscribers are:—

Wm. Hellewell, Sowerby-bridge, York 1
J. R. Meadows, Guide-bridge, Manchester, colour-maker 1
S. Huggins, Guide-bridge, Manchester, bookkeeper 1
Wm. Penny, 10, Adela-street, Belfast, commercial traveller 1
J. Hudson, Upper-mill, Oldham, plumber and painter 1
L. Pugh, 87, Broad-street, Manchester, colourman 1
A. Howorth, 176, Milnrow-road, Rochdale, clerk 1

Gazette Notices.

PARTNERSHIPS DISSOLVED.

D. S. HAYNES AND H. P. FINEMORE, Whitfield-street, Finsbury, London, manufacturing chemists and commission agents.
J. AND E. THOMAS AND GREEN, Woburn, paper makers, as far as regards E. Thomas.

L. ASHWORTH, J. ASHWORTH, AND J. WALSH, Cheadle and Manchester, under the style of Demming's Printing Co., calico printers.

Adjudications.

WALTER CUNNINGHAM, Grange Park-road, LEYTON AND DAY, W. REUBEN, Vicarage-road, Leyton (trading as Cunningham and Co.), Leyton, timber, lime, and cement merchants.

Notices of Dividends.

JOHN BROWN, of Rochdale, mineral water manufacturer, first and final dividend of 3s. 10½d., December 30. Official Receiver's Office, Oldham.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Measurement of Liquids. J. Pocock and S. Johnson. 20,198. Dec. 16.
Manufacture of Alloys of Aluminium. S. Pearson and J. H. Pratt. 20,214. December 16.
Manufacture of Metallic Electrodes.—(Complete Specification). F. Marx. 20,217. December 16.
Manufacture of Azoxy Aniline and of Colouring Matters derived therefrom. J. Imray. 20,219. December 16.
Disinfectants. A. Artmann and H. W. Kufek. 20,231. December 16.
Electricity Meters. A. Reckenzaun. 20,318. December 17.
Field-Magnets of Dynamo-Electric Machines. S. Kapp. 20,326. Dec. 18.
Manufacture of Hypophosphites. J. A. Kenall. 20,392. December 18.
Method and Apparatus for Extracting the Tannin from Bark used for Tanning Purposes. J. Hutchings and W. N. Hutchings. 20,403. Dec. 18.
Production of Ozone. A. Muirhead. 20,426. December 19.
Secondary Batteries. G. Philippart. 20,516. December 20.
Charging Gas Retorts. J. West. 20,551. December 21.
Electric Meters. I. Einstein and S. Kornprobst. 20,782. December 21.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Dec. 14th.

myl Acetate, £23 F. Stahl Schmidt & Co.

Intimony—

apan, 139 t. H. R. Merton & Co.

Intimony Ore—

France, 40 t. Pillow, Jones & Co.

A. Turkey, 30 Quirk, Barton & Co.

Japan, 2 H. R. Merton

Holland, 8 c. H. Boyce

Portugal, 9 H. Emanuel

" 3 Redfern, Alexander & Co.

Acetic Acid—

Holland, 199 pkgs. Beresford & Co.

Intimony Regalia—

Portugal, 10 t. Knowles & Co.

Larytes—

Germany, 44 cks. W. Harrison & Co.

" 19 A. Boltz

" 101 J. Maxton

" 23 W. Harrison & Co.

Holland, 20 J. Owen

" 20 Prpts. of Scott's Whl.

Barium Peroxide—

Germany, £109 Domeier & Co.

Bone Meal—

E. Indies, 200 t. F. A. Hodgkinson & Co.

Borax—

Germany, £49 F. Stahl Schmidt & Co.

Bromine—

Germany, £225 A. & M. Zimmermann

Caoutchouc—

Madagascar, 120 c. Kebbel, Son & Co.

E. Indies, 193 Carey & Browne

E. Africa, 720 J. H. & G. Scovell

C. America, 33 W. Johnson & Co.

E. Africa, 6 L. & I. D. Jt. Co.

Madagascar, 13 Matheson & Co.

E. Indies, 159 Anderson, Weber & Smith

B. Honduras, 7 Belsize Estate & Prod. Co.

Holland, 8 W. Balchin

E. Africa, 5 L. & I. D. Jt. Co.

" 45 Kebbel, Son & Co.

" 108 Clarke & Smith

" 22 Forbes, Forbes & Co.

Aden, 24 L. & I. D. Jt. Co.

E. Indies, 132 Clarke & Smith

Chemicals (otherwise undescribed)

Germany, £60 T. H. Lee

" 1,480 A. & M. Zimmermann

" 12 T. H. Lee

" 275 A. & M. Zimmermann

" 12 J. Paysen

" 18 Phillips & Graves

Cream Tartar—

France, 10 pkgs. M. Ashby

Holland, 14 Middleton & Co.

France, 5 Webb, Watter & Co.

Spain, 5

Holland, 70 N. Smith

Camphor—

Germany, 2 tubs. L. & I. D. Jt. Co.

" 4, 5 cs. J. W. Drysdale & Co.

Caustic Potash—

Holland, 21 pkgs. Spies Bros. & Co.

France, 8 F. W. Berk & Co.

Carbonic Acid—

Germany, 25 pkgs. Elkan & Co.

Dyestuffs—

Spain, 1 pkg. P. W. Hare

" 3 Major & Field

" 2 Mancha & Co.

" 1 Burgoyne, Burbridge & Co.

" 1 Hodgkinsons & Co.

" 3 Price, Hickman & Co.

" 1 R. Quincey & Son

" 1 Price, Hickman & Co.

" 1 J. Kniff & Co.

Extracts

France, 25 pkgs. Miller & Co.

Austria, 84 L. J. Levinstein & Co.

Denmark, 1 Fullwood & Bland

France, 175 L. J. Levinstein & Sons

Cutch

Burmah, 500 pkgs. H. C. Schmidt

Gambier

E. Indies, 183 W. H. Cole & Co.

" 84 P. & O. Co.

"	510	J. H. & G. Scovell
"	233	W. H. Cole & Co.
Sumac		
Italy,	100 pkgs.	F. Roberts
Orchella		
Portugal,	70 pkgs.	N. Smith
Aniline		
Holland,	1 pkg.	Hooton & Yates
U.S.	3	W. H. Cole & Co.
Cochineal		
Canaries,	2 pkgs.	Swanston & Co.
"	22	Marshall & French
"	17	A. Levy & Co.
"	6	Berrio & White
"	20	Bruce & White
Indigo		
Greytown,	26 arns.	Chalmers, Guthrie & Co.
E. Indies,	37 chts.	L. & I. D. Jt. Co.
"	98	T. H. Allan & Co.
"	5	Phillips & Graves
Annatto		
U. S.	2 pkgs.	Lewis & Peat.
Ceylon,	25	Hoare, Wilson & Co.
Myrabolams		
E. Indies,	1,094 pkgs.	J. Forsey
Madder		
Holland,	2 pkgs.	J. Owen
"	2	Union Lighterage Co.
Tanners' Bark		
Queensland,	1 t.	L. & I. D. Jt. Co.
Glucose		
Germany,	19 pkgs.	L. Sutro & Co.
"	200	200 Anderson, Weber & Smith
"	26	233 Union Lighterage Co.
"	100	100 J. Barber & Co.
"	25	220 Hyde, Nash & Co.
"	4	33 F. Stahlschmidt & Co.
"	700	700 J. Barber & Co.
"	54	180 L. & I. D. Jt. Co.
"	20	180 Dutrulle, Solomon & Co.
"	300	300 J. F. Ohlmann
"	40	236 Proprs. Chamberlains Wf.
"	20	160 T. M. Duche & Sons
"	2,000	2,000 L. & I. D. Jt. Co.
"	500	500 Olyett & Francis
"	4	35 J. Cooper
"	40	326 Proprs. Chamberlains Wf.
"	100	200 J. Forsey
"	21	180 C. Tennant, Sons & Co.
France,	232	232 Dutrulle, Solomon & Co.
Germany,	4	32 T. H. Lee
"	125	990 T. J. Darren
"	50	415 Anderson, Weber & Smith
"	21	175 C. Tennant, Sons & Co.
Gutta Percha		
E. Indies,	585 c.	J. H. & G. Scovell
"	4	L. & I. D. Jt. Co.
"	380	Kaltenbach & Schmitz
Iron Bromide		
Germany,	£500	A. & M. Zimmermann
Isinglass		
B.W. Indies,	1 cs.	Malcolm, Kearton & Co.
E.	16 pkgs.	Clarke & Smith
"	3	L. & I. D. Jt. Co.
"	22	"
B.W.I.	1	W. M. Smith & Sons
Sis. Settlements,	63	Hale & Son
Manure		
Phosphate Rock		
France,	120 t.	T. Farmer & Co.
"	180	Hunter, Waters & Co.
"	472	Moller, Graetz & Co.
Holland,	100	Lowes Manure Co.
Waste Salt		
Germany,	30 t.	Petri Bros.
Manure (otherwise undescribed)		
U. S.	2 t.	C. A. & H. Nichols
Mineral Salt		
Germany,	£100	N. S. B. Co.
Magnesia		
Holland,	£140	Beresford & Co.
Naphtha		
Holland,	7 brls.	Domeier & Co.
Germany,	7	"
Belgium,	10	H. Lorenz
Potassium Sulphate		
Germany,	7 pkgs.	Kilkan & Co.
Holland,	11	Beresford & Co.
"	10	A. Henry & Co.

Potassium Muriate		
Holland,	24 pkgs.	H. Johnson & Sons
Germany,	500	F. W. Berk & Co.
Potassium Bicarbonate		
Holland,	£25	A. & M. Zimmermann
Pitch		
France,	88 brls.	H. Hill & Sons
N. Russia,	350	Sieveling, Droop & Co.
Holland,	5	Rosenbery, Loewe & Co.
"	5	J. Owen
Germany,	49	Berlandina Brs. & Co.
Sweden,	85	"
Plumbago		
Holland,	00 cks.	Brown & Filmslie
Ceylon,	157	E. Barber & Co.
"	586	J. Thredder, Sons & Co.
Pyrites		
Spain,	1,428 t.	Societe Commerciale & Co.
Pomaron,	1,080	Mason & Barry
Potassium Carbonate		
Holland,	11 pkgs.	Spies Brs. & Co.
France,	9	E. W. Carling & Co.
Paraffin Wax		
U. S.	257 brls.	H. Hill & Sons
"	5,054	J. H. Usmar & Co.
"	160	H. Hill & Sons
Sugar of Lead		
Germany,	39 pkgs.	Beresford & Co.
"	16	C. J. Capes & Co.
Salammoniac		
Holland,	£120	Barr, Moering & Co.
Stearine		
Holland,	53 bgs.	H. Hill & Sons
"	183	J. H. Usmar & Co.
France,	76 sks.	J. Goddard & Co.
U. S.	144	"
"	12 brls.	Croager Brs.
Sodium Hyposulphite		
Holland,	£70	Beresford & Co.
Salicylic Acid		
Germany,	8 pkgs.	L. & I. D. Jt. Co.
"	11	Burgoyne, Burbidge & Co.
Saltpetre		
Holland,	18 cks.	Augspurg, Hopf & Co.
Germany,	60 kegs.	P. Hecker & Co.
E. Indies,	841 bgs.	Ralli Brs.
"	1,195	C. Wimple & Co.
Sodium Sulphate		
Holland,	£35	A. Henry & Co.
"	80	Reddaway, Martin & Co.
Tartaric Acid		
Holland,	9 pkgs.	Webb, Warter & Co.
"	70	H. S. Smith & Co.
"	11	Webb, Warter & Co.
"	8	"
"	20	Middleton & Co.
"	4	Augspurg, Hopf & Co.
"	14	N. Smith
"	6	S. Smith
"	3	Webb, Warter & Co.
"	14	Middleton & Co.
Tar		
Libau,	24 brls.	C. Arendt
Ultramarine		
Holland,	15 cs.	A. Henry & Co.
Germany,	6 pkgs.	H. Brooks & Co.
Holland,	12 cs.	Ohienschlager Brs.
"	12	"
"	1 pkg.	Glaser & Vogeler
Zinc Oxide		
Germany,	130 cks.	M. Ashby
"	13	Beresford & Co.
"	50	W. A. Rose & Co.

LIVERPOOL.

Week ending Dec. 18th.

Acetate of Lime		
St. Nazaire,	7 cks.	
New York,	1829 bgs	
Bones		
Boston,	165 cks.	J. Gordon & Co.
Parnahiba,	4 t.	R. Singlehurst & Co.
Barytes		
Antwerp,	27 cks.	
Cream Tartar		
Bordeaux,	9 cks.	
Rotterdam,	7	
Copper Precipitate		
Huelva,	159 t	Beauford & Co.
Copper Ore		
Hamburg,	297 bgs.	
Lisbon,	19 t.	Harrington & Co.
New York,	175 brls.	Am. Metal Co.

Charcoal		
Hamburg,	1 pkg.	
Chemicals (otherwise undescribed)		
Rotterdam,	2 cks.	
Caoutchouc		
Philadelphia,	50 1/2 brls.	
Gaboon,	128 cks.	Hatton & Cookson
Elloby,	62	"
Dyestuffs		
Saffron		
Valencia,	2 cs.	Okell & Co.
Valonia		
Patras,	677 bgs.	H. Theakstone & Co.
"	85	Barff & Co.
Constantinople,	196 bgs.	A. Papazoglou
Smyrna,	34 bgs.	"
Argols		
Oporto,	22 cks.	F. Leyland & Co.
Sumac		
Bordeaux,	50 bls.	
Annatto		
Bordeaux,	2 hds.	3 cks.
Glycerine		
St. Nazaire,	4 cks.	
Rotterdam,	2 dms.	
Hamburg,	7 chys.	3 cks.
Bordeaux,	50 cks.	
Glucose		
Hamburg,	50 cks.	
Philadelphia,	200 brls.	
New York,	250	
Litharge		
Rotterdam,	12 cks.	
Manganese Ore		
Bordeaux,	203 t.	G. G. Blackwell
Poti,	1920	
Potash		
Rouen,	19 cks.	R. J. Francis & Co.
"	29 21 dms.	Co-op. W'sale Society
Pyrites		
Huelva,	1357 t.	Beauford & Co.
Phosphate		
St. Valery,	200 t.	
Saltpetre		
Hamburg,	100 cks.	
"	5	
Sodium Phosphate		
Rotterdam,	16 cks.	
Salt		
Antwerp,	1 bg.	
Stearine		
Philadelphia,	5 tcs.	29 hds.
New York,	25	
Sulphur		
Catania,	400 t.	
Tartaric Acid		
Rotterdam,	40 cks.	
"	7	
Tartar		
Bordeaux,	54 cks.	
Ultramarine		
Hamburg,	20 cs.	
Rotterdam,	3 cks.	5
"	2	8
Verdigris		
Bordeaux,	2 cks.	
Waste Salt		
Hamburg,	326 bgs.	
Zinc Oxide		
St. Nazaire,	25 brls.	
Rotterdam,	100 cks.	O. & H. Marcus
Antwerp,	40 brls.	J. T. Fletcher & Co.
Antwerp	140	

TYNE.

Week ending December 19th.

Alum Earth		
Hamburg,	18 cks.	Tyne S.S. Co.
Glycerine		
Hamburg,	1 drm.	
Sulphur Ore		
Drontheim,	400 t.	R. S. Story & Co.
Ultramarine		
Rotterdam,	20 cs.	Tyne S.S. Co.

GLASGOW.

Week ending Dec. 19th.

Acetate of Lime		
New York,	354 bgs	
Brimstone		
Girgenti,	600 t.	
Dyestuffs		
Sumac		
Palermo,	1,800 brs.	119 bales.
Alizarine		
Rotterdam,	70 cks.	J. Rankine & Son
"	1 cs.	65

Glyc
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Rott
Pyrit
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Potas
DunkPhosp
Dunk
Phosp
Roue
HuelSulph
CatanSteari
AntwTar—
StockTurpe
Bruns
Utran
Rotte

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New Companies.

BENGAL INDIGO MANUFACTURING COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £150,000, in £10. shares, to carry on business as indigo planters, and manufacturers of, and dealers in indigo, and also as farmers, graziers, growers, manufacturers, and dealers in all kinds of tropical products. The subscribers are:—

	Shares.
W. E. Medland, Withington, near Manchester, merchant and manufacturer	1
M. A. Herriman, Hamburg, merchant	1
E. C. Schrottky, Dresden	1
J. Leigh, Knutsford	1
S. Mosley, 104, King-street, Manchester, chartered accountant	1
J. B. Lonsdale, 9, Fennel-street, Manchester, merchant	1
J. W. Radcliffe, Werneth-park, Oldham, merchant, &c.	1
F. Karuth, 58, Perham-road, West Kensington	1

DAVID MARTINEAU AND SONS, LIMITED.—This company was registered on the 12th inst., with a capital of £250,000, in £10. shares, to acquire as a going concern the business of David Martineau and Sons, of Christian-street, sugar refiners. The subscribers are:—

	Shares.
David Martineau, 21, Mincing-lane, sugar refiner	1
G. Martineau, 21, Mincing-lane, sugar refiner	1
W. S. Hodgson, Esher, Surrey	1
C. H. Gill, Staines, sugar refiner	1
E. S. Hobson, 21, Mincing-lane, clerk	1
R. W. Brown, 41, Kirkstall-road, Streatham-hill, clerk	1
C. F. Worters, 125, Sunderland-road, Forest-hill	1

WITTY AND WYATT, LIMITED.—This company was registered on the 12th inst., with a capital of £30,000, in £1. shares, to manufacture and deal in asbestos and asbestos goods, and to enter into an agreement with Messrs. Witty and Wyatt. The subscribers are:—

	Shares.
H. H. Witty, 88, Leadenhall-street, merchant	7,499
R. C. Wyatt, 88, Leadenhall-street, merchant	7,499
Torre Diaz, 41, Moorgate-street, merchant	7,500
J. M. de Zuluetta, 41, Moorgate-street, merchant	7,499
P. Pate, 55, Leadenhall-street, secretary to a company	1
F. H. Lovegrove, 88, Leadenhall-street, clerk	1
J. T. Hancock, 13, Goodwin-road, Forest-gate, secretary to a company	1

ENGLISH PORTLAND CEMENT COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £25,000, in £1. shares, to manufacture cement and similar substances, and to adopt an agreement with Messrs. Irwin, Hopper, and Co. The subscribers are:—

	Shares.
R. Morris, J. P., Doncaster	500
Mrs. G. Morris, Doncaster	120
Miss H. E. Morris, Doncaster	10
Miss M. Morris, Doncaster	10
Mrs. M. A. Morris, Doncaster	100
W. R. Morris, Doncaster, merchant	250
Miss C. Woodhouse, Doncaster	10

KUHN PATENT PASTEURIZATION SYNDICATE, LIMITED.—This syndicate was registered on the 12th inst., with a capital of £20,000, in £1. shares, to acquire the patent rights of Wm. Kuhn, relating to the Pasteurization of beer, wines, and other liquids. The subscribers are:—

	Shares.
E. W. Owles, 14, Ordinance-road, St. John's Wood, clerk	1
A. E. Pridmore, 2, Broad-street-buildings, architect	1
T. J. Sturgeon, Broad-street-buildings, commission agent	1
O. Verne, 10, New Broad-street, solicitor	1
J. Wakefield, 4, Keppel-street, Russell-square, commission agent	1
J. M. Sharp, 1, Finsbury-square, solicitor	1
R. J. Jeffes, 4, Westbourne-terrace, Lower Clapton, clerk	1

HEATHLEY, JANISCH, AND COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £3,000, in £1. shares, to trade as chemists, druggists, and dealers in proprietary articles, and in all kinds of electrical and scientific apparatus. The subscribers are:—

	Shares.
J. Heathley, Blyth, grocer	1
G. A. Heathley, Newcastle-on-Tyne, chemist's assistant	1

	Shares.
Ralph Carr, Newcastle-on-Tyne, insurance agent	1
W. Turnbull, Newcastle-on-Tyne, draper	1
Mrs. Turnbull, Newcastle-on-Tyne	1
Mrs. E. Janisch, Newcastle-on-Tyne	1
E. Towers, Tynemouth, accountant	1

AUDENSHAW PAINT AND COLOUR COMPANY, LIMITED.—This company was registered on the 12th inst., with a capital of £10,000, in £1. shares, to acquire the business of the Audenshaw Paint and Colour Co., at Palatine Works, Guide-lane, Guide-bridge, near Manchester, and at 11, Great Ducie-street, Strangeways, Manchester. The subscribers are:—

	Shares.
Wm. Hellewell, Sowerby-bridge, York	1
J. R. Meadows, Guide-bridge, Manchester, colour-maker	1
S. Huggins, Guide-bridge, Manchester, bookkeeper	1
Wm. Penny, 10, Adela-street, Belfast, commercial traveller	1
J. Hudson, Upper-mill, Oldham, plumber and painter	1
L. Pugh, 87, Broad-street, Manchester, colourman	1
A. Howorth, 176, Millrow-road, Rochdale, clerk	1

Gazette Notices.

PARTNERSHIPS DISSOLVED.

D. S. HAYNES AND H. P. FINKMORE, Whitfield-street, Finsbury, London, manufacturing chemists and commission agents.

J. AND E. THOMAS AND GREEN, Woburn, paper makers, as far as regards E. Thomas.

L. ASHWORTH, J. ASHWORTH, AND J. WALSH, Chaddle and Manchester, under the style of Demming's Printing Co., calico printers.

Adjudications.

WALTER CUNNINGHAM, Grange Park-road, Leyton AND DAY, W. REUBEN, Vicarage-road, Leyton (trading as Cunningham and Co.), Leyton, timber, lime, and cement merchants.

Notices of Dividends.

JOHN BROWN, of Rochdale, mineral water manufacturer, first and final dividend 3s. 10½d., December 30. Official Receiver's Office, Oldham.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Measurement of Liquids.	J. Pocock and S. Johnson.	20,198.	Dec. 16.
Manufacture of Alloys of Aluminium.	S. Pearson and J. H. Pratt.	20,211.	December 16.
Manufacture of Metallic Electrodes.—(Complete Specification).	F. Marx.	20,217.	December 16.
Manufacture of Azoxy Aniline and of Colouring Matters derived therefrom.	J. Inray.	20,219.	December 16.
Disinfectants.	A. Arimann and H. W. Kufcke.	20,231.	December 16.
Electricity Meters.	A. Reckenzahn.	20,178.	December 17.
Field-Magnets of Dynamo-Electric Machines.	S. Kapp.	20,326.	Dec. 18.
Manufacture of Hypophosphites.	J. A. Kendall.	20,302.	December 18.
Method and Apparatus for Extracting the Tannin from Bark used for Tanning Purposes.	J. Hutchings and W. N. Hutchings.	20,403.	Dec. 18.
Production of Ozone.	A. Muirhead.	20,426.	December 19.
Secondary Batteries.	G. Philippart.	20,516.	December 20.
Charging Gas Retorts.	J. West.	20,551.	December 21.
Electric Meters.	I. Einstein and S. Kornprobst.	20,782.	December 21.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Dec. 14th.

Amyl Acetate, £73 F. Stahlschmidt & Co.

Antimony— Japan, 139 lb. H. R. Merton & Co.

Antimony Ore— France, 40 t. Pillow, Jones & Co.

A. Turkey, 30 Quirk, Barton & Co.

Japan, 2 H. R. Merton

Holland, 3 c. H. Emanuel

Portugal, 0 3 Redfern, Alexander & Co.

Acetic Acid— Holland, 199 pkgs. Beresford & Co.

Antimony Regulus— Portugal, 10 lb. Knowles & Co.

Barytes— Germany, 44 cks. W. Harrison & Co.

" " A. Boltz

" " J. Matton

" " W. Harrison & Co.

" " J. Owen

" " Prprs. of Scott's Whf.

Barium Peroxide—

Germany, £109 Domeier & Co.

Bone Meal— E. Indies, 200 t. F. A. Hodgkinson & Co.

Borax— Germany, £49 F. Stahlschmidt & Co.

Bromine— Germany, £225 A. & M. Zimmermann

Caoutchouc— Madagascar, 120 c. Kebbel, Son & Co.

" " 193 Carey & Browne

E. Indies, 10 J. H. & G. Scovell

E. Africa, 720 W. Johnson & Co.

C. America, 33 R. G. Hall & Co.

E. Africa, 6 L. & I. D. Jt. Co.

" " 86 Matheson & Co.

Madagascar, 13 Anderson, Weber & Co.

E. Indies, 159 Smith

B. Honduras, 7 Belsize Estate & Prod. Co.

Holland, 3 W. Balch

E. Africa, 5 L. & I. D. Jt. Co.

" " 45 Kebble, Son & Co.

" " 108 Clarke & Smith

" " 22 Forbes, Forbes & Co.

Aden, 24 L. & I. D. Jt. Co.

E. Indies, 132 Clarke & Smith

" " 132 L. & I. D. Jt. Co.

Chemicals (otherwise undescribed)

Germany, £60 T. H. Lee

" " 1,480 A. & M. Zimmermann

" " 12 T. H. Lee

" " 275 A. & M. Zimmermann

" " 12 J. Paysen

" " 15 Phillips & Graves

Cream Tartar—

France, 10 pkgs. M. Ashby

Holland, 14 Middleton & Co.

France, 5 Webb, Warter & Co.

Spain, 5 " "

Holland, 70 N. Smith

Camphor—

Germany, 2 tubs. L. & I. D. Jt. Co.

" " 4 5 cts. J. W. Drysdale & Co.

Caustic Potash—

Holland, 21 pkgs. Spies Bros. & Co.

France, 8 F. W. Berk & Co.

Carbonic Acid—

Germany, 25 pkgs. Elkan & Co.

Dyestuffs—

Saffron

Spain, 1 pkg. P. W. Hore

" " 3 Major & Field

" " 2 Mancha & Co.

" " 1 Burgoyne, Burbidge & Co.

" " 1 Hodgkinsons & Co.

" " 3 Price, Hickman & Co.

" " 1 R. Quinlan & Son

" " 1 Price, Hickman & Co.

" " 1 J. Knill & Co.

Extracts

France, 25 pkgs. Miller & Co.

Austria, 84 L. J. Levinstein & Sons

Denmark, 1 Fullwood & Bland

France, 175 L. J. Levinstein & Sons

Cutch

Burnah, 300 pkgs. H. C. Schmidt

" " 600 Rqs. & Deering

Gambier

E. Indies, 183 W. H. Cole & Co.

" " 84 P. & O. Co.

Calcium Chloride —		
Auckland 2 t. 10 c.	£5	
Carbolic Acid —		
New York 9 t. 3 c. 2 q.	£886	
Barcelona 19	19	
Amsterdam 10	52	
Citric Acid —		
New Orleans 2 c.	£19	
Dunging Salts —		
New York 5 t.	£49	
Dried Blood —		
Valencia 6 t.	£56	
Epsom Salts —		
Rio Janeiro 100 kegs.		
Glycerine —		
New York 3 t. 21 cks.	£206	
Glauber Salt —		
Bombay 1 t.	£5	
Iron Oxide —		
Genoa 2 t.	£10	
Magnesia —		
Hamburg 10 cs.		
Rio Janeiro 10		
Mexico 5		
Santander 3		
Manure —		
Lisbon 4 t.	£10	
Havana 1	40	
Havre 98 1 c. 2 q.	294	
Oxalic Acid —		
Genoa 1 t.	£46	
Pitch —		
Naples 210 t.		
New York 35 cks.		
Potassium Chlorate —		
Venice 6 c.	£16	
Rotterdam 5	15	
New York 22 t. 10	1132	
Genoa 1	44	
Naples 1	42	
Gothenburg 29	1368	
Hamburg 1	48	
Rotterdam 5	10	
Copenhagen 5	6	
Havana 1	15	
Shanghai 1	10	
Potassium Bichromate —		
Boston 4 c.	£14	
Ancona 11 1 q.	22	
Havre 4 t. 15	140	
Odessa 9	14	
Potassium Chromate —		
Naples 10 c. 2 q.	£15	
Leghorn 2 t. 15	112	
Potassium Carbonate —		
Chicago 2 t. 10 c.	£45	
Potash —		
Philadelphia 12 c. 1 q.	£15	
Phosphate Rock —		
Hamburg 310 t. 1 c. 2 q.	£1496	
Potassium Prussiate —		
Barcelona 3 t. 10 c.	£227	
Salt —		
Axim 25 t.		
Amsterdam 150		
Antwerp 255		
Barbadoes 106		
Bonny 200		
Calcutta 1042		
Chicago 130		
Chama 10		
Copenhagen 105		
Christiana 500		
Grand Bassa 10		
Halifax 400		
Havana 20 cs.		
Kingston 40		
Kobe 1		
Livingstone 200		
Loango 27		
M. Video 12		
New York 291		
Opofa 750		
Port Natal 40		
Porsgrund 200		
Portland M. 80		
Ponce 50 cs.		
Rosario 12		
Rotterdam 98		
Bio Grande 10 Sul 70 cs.		
Rouen 10		
Salt Pond 7		
San Francisco 72		
Sierra Leone 200		
Wellington 463		
Soda Ash —		
Barcelona 32 cks. 12 brls.		
Baltimore 764 tcs. 555		
Bahia 10		
Bari 1		
Boston 200 bags. 296		

Bilbao	35	
B Ayres 100		
Boston, 266 tcs. 46 cks. 604 bgs.		
B. Ayres 250 brls.		
Buffalo 60		
Calcutta 7		
Ceara 50		
Ghent 14 cks.		
Genoa 5		
Leghoan 1		
Malaga 10		
Marbrham 30		
Marseilles 20		
New Orleans 6		
New York 155		
Naples 35		
New York 460 tcs.		
Oporto 6		
Philadelphia 599 tcs. 220 cks.		
Odessa 100		
Salonica 28		
San Francisco 67		
Syra 220		
Rio Janeiro 135		
Santos 15		
Sherbrooke 17 tcs.		
Vola 15		
Wellington 20		
Sodium Silicate —		
Barcelona 16 cks.		
Constantinople 20		
Malaga 6 brls.		
Seville 6		
Smyrna 20		
Valencia 15		
Venice 32		
Sodium Carbonate —		
Poston 196 brls.		
San Luis Potosi 20 cks.		
Gothenburg 28		
Leghorn 1		
Soda Crystals —		
Calcutta 85 brls.		
Constantinople 50		
Gibraltar 10		
Halifax 103		
London, Ont. 25		
New Orleans 100		
New York 38 cks.		
San Sebastian 30 bgs.		
Smyrna 90		
Philadelphia 125		
Singapore 8		
Sodium Bicarbonate —		
Antwerp 20 pkgs.		
B. Ayres 80 cks.		
Melbourne 320 kgs. 54		
San Juan P.R. 20		
Seville 20		
Sydney 200 42		
Sulphur —		
Savannah 13 c 3 q. £9		
Crenfuegos 17 3 7		
Calcutta 10 t. 10 61		
Vern Cruz 9 16 62		
Jonique 7 10 50		
Boston 40 176		
New York 25 10 115		
Portland M. 30 9 145		
Mexico 4 18 31		
Sodium Nitrate —		
Cartagena 5 2 £45		
Sodium Biorate		
Antwerp 7 t. 14 c. 3 q. £239		
Bordeaux 3 2 2 93		
Portland M. 1 13 2 35		
Rotterdam 4 13 125		
Salammoniac —		
Algiers 3 c. £5		
Alexandria 16 28		
Naples 18 2 q. 30		
Smyrna 2 t. 11 2 87		
Palermo 9 15		
Trieste 1 34		
Genoa 9 1 16		
Constantinople 14 23		
Bombay 294 499		
Syra 3 5		
Superphosphate —		
New Orleans 300 t. 9 c. 1 q. £601		
Stettin 25 1 1 q. 78		
Sodium Sulphate —		
Portland 5 t. 2 c. £10		
Saltpetre —		
Valparaiso 11 t. 15 c. 1 q. £251		
Syra 3 9 74		
Monas 5 3 7		
Ceara 1 4 2 30		
Sodium Bichromate —		
Yokohama 3 11 2 £107		
Saltcake —		
Baltimore 199 t. 19 c. £353		
Philadelphia 25 10 47		
Sheep Dip —		
E. London 1 t. 1 q. £43		

Tar —		
Ambriz 10 brls.		
Santander 6 cks.		
Tartar —		
New York 30 t.	£2850	
Zinc Muriate —		
Bombay 11 cks. 7 t. 3 c. 3 q. £159		

TYNE.

Week ending Dec. 19th.

Alkali —		
Copenhagen, 11 t. 17 c.		
Rotterdam, 10		
Christiania, 15		
Anthracene —		
Rotterdam, 58 brls.		
Ammonia Carbonate —		
Odense, 1 t. 5 c.		
Ammonia Sulphate —		
Odense, 2 t.		
Antwerp, 30		
Antimony —		
Hamburg, 2 t. 10 c.		
New York, 15		
Bleaching Powder —		
Copenhagen, 106 t. 8 c.		
Libau, 33 5		
Rotterdam, 15 4		
" 5 13		
Horsens, 1 3		
Antwerp, 9 6		
" 40 7		
Hamburg, 5 13		
Gothenburg, 5		
Riga, 60 12		
New York, 120 18		
Stockholm, 1 11		
Copenhagen, 9 5		
Bone Ash —		
Antofagasta, 2 c.		
Ergastria, 17		
Barytes Carbonate —		
Hamburg, 8 t.		
Caustic Soda —		
Hamburg, 16 c.		
Christiania, 6 6		
Philadelphia, 29		
New York, 94 6		
Stockholm, 4 7		
Copenhagen, 2 16		
Flint Ground —		
Antwerp, 50 t.		
Gypsum —		
New York, 35 t.		
Litharge —		
Antwerp, 1 t. 13 c.		
Hamburg, 1 12		
Stockholm, 1		
Magnesia —		
Antwerp, 2 c.		
Hamburg, 7		
Pitch —		
Copenhagen, 40 t.		
Antwerp, 103 5c.		
Plumbago Crucibles —		
Ergastria, 4 c.		
Plumbago —		
Ergastria, 1 c.		
Pearl Ash —		
Ergastria, 1 c.		
Potassium Chlorate —		
Hamburg, 1 t.		
Philadelphia, 2		
Paraffin Wax —		
Stockholm, 5 t. 5 c.		
Soda —		
Copenhagen, 21 t. 8 c.		
Rotterdam, 17 5		
" 21 11		
Aalborg, 9 1		
" 25 15		
Odense, 10 13		
Nykjobing, 6 14		
Svendborg, 14 8		
Christiania, 10		
Philadelphia, 257 16		
Stockholm, 43 14		
" 10 3		
Copenhagen, 25		
Soda Ash —		
Antwerp, 16 t.		
Riga, 15 6 c.		
New York, 100 4		
Copenhagen, 1 19		
Libau, 6 t.		
Soda Salts —		
Philadelphia, 5 t.		

Alka
Liba
Mar
Ode
Benz
Dun
Bone
Han
Caus
Anti
Cope
Han
Liba
Steti
Chem
Antw
Gend
Ams
Han
Bren
Ham
Berg
Liba
Nap
Chris
Cope
Dron
Dunk
Goth
New
Odes
Roue
Rote
Steti
Stava
Dyest
Antw
Chris
Ham
Reval
Rote
Manu
Ham
Naph
Dunk
Pitch
Antw
Nap
Slag
Amste
Turpe
Dron
Tar
Genoa
Hamb

Wee.
Chemi
Diepp
Ham
Dyest
Diepp

W
Benz
Rote
Terne
Bleac
Rote
Chemi
Boulo
Ham
Rote
Coal
Cala
Rote
Dyest
Ghen
" "
" "
Ham
Rote
Manu
Boul
Ghen
Ham
Pitch
Antw

GOOLE.		Dyestuffs—		Hamburg		Saltpetre—	
Week ending December 11th.		Allazarine		100		Hamburg	
		Rotterdam		100		Rotterdam	
		28 cks.		40 cks.		20 cks.	
Antimony—		Dyestuffs (otherwise undecorated)		Glycerine—		Sodium Silicate—	
Boulogne		31 cks.		Rotterdam		Rotterdam	
Alum—		Indigo		Potash—		Tartaric Acid—	
Rotterdam		3 cts.		Calais		Rotterdam	
Caustic Soda—		Glucose—		Plumbago—		Waste Salt—	
Boulogne		Calais		Boulogne		Hamburg	
		100 bgs.		11		157 cks.	
						500 bgs.	

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.		Hydrochloric Acid—		Tartaric Acid—		Barcelona,	
Week ending December 14th.		Trinidad,		Sydney,		Beyrout,	
		5 c.		11		Bilbao,	
		19		Melbourne.		Ceara,	
		Lime Salts—				Boston,	
		Boston,				Brantford,	
		5 c.				Carthagena,	
		Manure—				Genoa,	
		Bordeaux,				Dunedin,	
		30 t.				E. London,	
		114				Calcutta,	
		337				Havana,	
		174				Catania,	
		645				Higo,	
						100	
						Ihrail,	
						La Guayra,	
						5	
						Lisbon,	
						77	
						Madras,	
						10	
						Maranham,	
						5	
						Messina,	
						10	
						Melbourne,	
						30	
						Naples,	
						155	
						Mollendo,	
						25	
						New Orleans,	
						450	
						New York,	
						700 dms.	
						60 bxs.	
						Oporto,	
						60 dms.	
						Portland, O.,	
						50	
						Para,	
						4	
						Philadelphia,	
						255	
						Portland, O.,	
						100	
						Seville,	
						106	
						Port Natal,	
						18 bxs.	
						10 cks.	
						Riga,	
						836 dms.	
						Rouen,	
						226	
						Rotterdam,	
						30	
						St. John's Nfld.	
						7 pkgs.	
						San Francisco	
						200 dms.	
						Valencia	
						10	
						Wellington	
						7	
						San Sebastian	
						40	
						Santander, 17 brls.	
						12 kegs.	
						21 dms.	
						Seville, 80 cks.	
						6 brls.	
						Singapore	
						20 dms.	
						Tarragona	
						30 brls.	
						Trieste	
						22 dms.	
						Valencia, 25 kegs	
						16	
						Valparaiso	
						102	
						Vera Cruz	
						10	
						Woodstock, Ont.	
						100	

Calcium Chloride—		
Auckland 2 t. 10 c.	£5	
Carbolic Acid—		
New York 9 t. 3 c. 2 q.	£886	
Barcelona 2	19	
Amsterdam 10	52	
Citric Acid—		
New Orleans 2 c.	£19	
Dunging Salts—		
New York 5 t.	£49	
Dried Blood—		
Valencia 6 t.	£56	
Epsom Salts—		
Rio Janeiro 100 kegs.		
Glycerine—		
New York 3 t. 23 cks.	£206	
Glauber Salt—		
Bombay 1 t.	£5	
Iron Oxide—		
Genoa 2 t.	£10	
Magnesia—		
Hamburg 10 cs.		
Rio Janeiro 10		
Mexico 5		
Santander 3		
Manure—		
Libon 4 t.	£10	
Bavaria 1	40	
Havre 92 t. c. 2 q.	294	
Oxalic Acid—		
Genoa 1 t.	£46	
Pitch—		
Naples 210 t.		
New York 35 cks.		
Potassium Chlorate—		
Venice 6 c.	£16	
Rotterdam 10	15	
New York 22 t. 10	1132	
Genoa 1	44	
Naples 1	42	
Gothenburg 29	1368	
Hamburg 1	48	
Rotterdam 5	263	
Copenhagen 5	6	
Havana 1	15	
Shanghai 1	77	
Potassium Bichromate—		
Boston 4 c.	£14	
Ancona 11 t. 1 q.	22	
Havre 4 t. 15	140	
Odessa 9	14	
Potassium Chromate—		
Naples 10 c. 2 q.	£15	
Leghorn 2 t. 15	112	
Potassium Carbonate—		
Chicago 2 t. 10 c.	£45	
Potash—		
Philadelphia 12 c. 1 q.	£15	
Phosphate Rock—		
Hamburg 310 t. 1 c. 2 q.	£1496	
Potassium Prussiate—		
Barcelona 3 t. 10 c.	£227	
Salt—		
Achim 25 t.		
Amsterdam 150		
Antwerp 255		
Barbadoes 106		
Bonny 200		
Calcutta 1042		
Chicago 130		
Chama 10		
Copenhagen 105		
Christiana 500		
Grand Baza 10		
Halifax 400		
Havana 20 cs.		
Kingston 40		
Kobe 1		
Livingstone 200		
Leango 27		
M. Video 12		
New York 291		
Opoko 750		
Port Natal 40		
Longrun 300		
Portland M. 80		
Rene 50 cs.		
Rosario 12		
Rotterdam 98		
Rio Grande do Sul 70 cs.		
Ruen 10		
Salt Pond 7		
San Francisco 72		
Serra Leone 200		
Wellington 463		
Soda Ash—		
Barcelona 32 cks. 12 brls.		
Baltimore 764 tcs. 555		
India 10		
Port 1		
Port, 200 bags. 296		

Bilbao 35		
B. Ayres 100		
Boston, 266 tcs. 46 cks. 604 bgs.		
B. Ayres 250 brls.		
Buffalo 60		
Calcutta 7		
Ceara 50		
Ghent 14 cks.		
Genoa 5		
Leghoan 1		
Malaga 10		
Marlham 30		
Marseilles 20		
New Orleans 6		
New York 155		
Naples 35		
New York 460 tcs.		
Oporto 6		
Philadelphia 599 tcs. 220 cks.		
Odessa 100		
Salonica 28		
San Francisco 67		
Syra 220		
Rio Janeiro 135		
Santos 15		
Sherbrooke 17 tcs.		
Vola 15		
Wellington 20		
Sodium Silicate—		
Barcelona 16 cks.		
Constantinople 20		
Malaga 6 brls.		
Seville 6		
Smyrna 20		
Valencia 15		
Venice 32		
Sodium Carbonate—		
Poston 196 brls.		
San Luis Potosi 20 cks.		
Gothenburg 28		
Leghorn 1		
Soda Crystals—		
Calcutta 85 brls.		
Constantinople 50		
Gibraltar 10		
Halifax 103		
London, Ont. 25		
New Orleans 100		
New York 38 cks.		
San Sebastian 30 bgs.		
Smyrna 90		
Philadelphia 125		
Singapore 8		
Sodium Bicarbonate—		
Antwerp 20 pkgs.		
B. Ayres 80 cks.		
Melbourne 320 kgs. 54		
San Juan P.R. 20		
Seville 20		
Sydney 200		
Sulphur—		
Savanna 13 c 3 q. £69		
Crenfuegos 17 3 7		
Calcutta 10 t. 10 61		
Vern Cruz 9 16 1 62		
Iquique 7 10 50		
Boston 40 176		
New York 25 10 115		
Portland M. 30 0 145		
Mexico 4 18 2 31		
Sodium Nitrate—		
Cartagena 5 2 £45		
Sodium Biurate		
Antwerp 7 t. 14 c. 3 q. £239		
Bordeaux 3 2 2 93		
Portland M. 1 13 2 35		
Rotterdam 4 13 125		
Salammoniac—		
Algiers 3 c. £5		
Alexandria 16 28		
Naples 18 2 q. 30		
Smyrna 2 t. 11 2 87		
Palermo 9 15		
Trieste 1 34		
Genoa 9 1 16		
Constantinople 14 23		
Bombay 294 499		
Syra 3 5		
Superphosphate—		
New Orleans 300 t. 9 c. 1 q. £601		
Stettin 25 1 1 78		
Sodium Sulphate—		
Portland 5 t. 2 c. £10		
Saltpetre—		
Valparaiso 11 t. 15 c. 1 q. £251		
Syra 3 9 1 74		
Monaos 5 3 7		
Ceara 1 4 2 30		
Sodium Bichromate—		
Yokohama 3 11 2 £107		
Saltcake—		
Baltimore 199 t. 19 c. £353		
Philadelphia 25 10 47		
Sheep Dip—		
E. London 1 t. 1 q. £43		

Tar—		
Ambriz 10 brls.		
Santander 6 cks.		
Tartar—		
New York 30 t.	£2850	
Zinc Muriate—		
Bombay 11 cks. 71. 3 c. 3 q. £159		

TYNE.

Week ending Dec. 19th.

Alkali—		
Copenhagen, 11 t. 17 c.		
Rotterdam, 10		
Christiania, 15		
Anthracene—		
Rotterdam, 58 brls.		
Ammonia Carbonate—		
Odense, 1 t. 5 c.		
Ammonia Sulphate—		
Odense, 2 t.		
Antwerp, 30		
Antimony—		
Hamburg, 2 t. 10 c.		
New York, 15		
Bleaching Powder—		
Copenhagen, 106 t. 8 c.		
Libau, 33 5		
Rotterdam, 15 4		
Horsens, 5 13		
Antwerp, 1 3		
40 7		
Hamburg, 5 13		
Gothenburg, 5		
Riga, 60 12		
New York, 120 18		
Stockholm, 1 11		
Copenhagen, 9 5		
Bone Ash—		
Antofagasta, 2 c.		
Ergastiria, 17		
Barytes Carbonate—		
Hamburg, 8 t.		
Caustic Soda—		
Hamburg, 16 c.		
Christiania, 6 6		
Philadelphia, 29		
New York, 94 6		
Stockholm, 4 7		
Copenhagen, 2 16		
Flint Ground—		
Antwerp, 50 t.		
Gypsum—		
New York, 35 t.		
Litharge—		
Antwerp, 1 t. 13 c.		
Hamburg, 1 12		
Stockholm, 1		
Magnesia—		
Antwerp, 2 c.		
Hamburg, 7		
Pitch—		
Copenhagen, 40 t.		
Antwerp, 103 5c.		
Plumbago Crucibles—		
Ergastiria, 4 c.		
Plumbago—		
Ergastiria, 1 c.		
Pearl Ash—		
Ergastiria, 1 c.		
Potassium Chlorate—		
Hamburg, 1 t.		
Philadelphia, 2		
Paraffin Wax—		
Stockholm, 5 t. 5 c.		
Soda—		
Copenhagen, 21 t. 8 c.		
Rotterdam, 17 5		
" 21 11		
Aalborg, 9 1		
" 25 15		
Odense, 10 13		
Nykjobing 6 14		
Svendborg, 14 8		
Christiania, 10		
Philadelphia, 257 16		
Stockholm, 43 14		
" 16 3		
Copenhagen, 25		
Soda Ash—		
Antwerp, 16 t.		
Riga, 15 6 c.		
New York, 100 4		
Copenhagen, 19		
Libau, 6 t.		
Soda Salts—		
Philadelphia, 5 t.		

HULL.

Week ending Dec. 17th.

Alkali—		
Libau, 225 cks.		
Marseilles, 350 drms.		
Odessa, 371		
Benzol—		
Dunkirk, 23 cks.		
Bone Size—		
Hamburg, 5 cks.		
Caustic Soda—		
Antwerp, 19 drms.		
Copenhagen, 40		
Hango, 11 cks.		
Libau, 67		
Stettin, 10		
Chemicals (otherwise undescribed)		
Antwerp, 4 cs.		
Genoa, 49 5 cks. 60 pkgs.		
Amsterdam, 6 10 1		
Hango, 3 4		
Bremen, 2		
Hamburg, 36 15 10		
Bergen, 21 10		
Libau, 20		
Naples, 2		
Christiania, 7 pkgs. 203 slabs		
Copenhagen, 2 115		
Drontheim, 22		
Dunkirk, 1 cks		
Gothenburg, 13 40 56		
New York, 75 cs.		
Odessa, 194 cks. 96 pkgs.		
Rouen, 40		
Rotterdam, 27 cks. 40 cs.		
Stettin, 4 1 pkg.		
Stavanger 20		
Dyestuffs (otherwise undescribed)		
Antwerp, 1 ck.		
Christiana, 2 cks.		
Hamburg, 13 1 keg.		
Reval, 68		
Rotterdam, 1 cs. 6 cks.		
Manure—		
Hamburg, 2,886 bgs.		
Naphtha—		
Dunkirk, 19 cks.		
Pitch—		
Antwerp, 539 t.		
Naples, 255		
Slag—		
Amsterdam, 75		
Turpentine—		
Drontheim, 3 c.		
Tar—		
Genoa, 110 cks.		
Hamburg, 8 cs.		

GRIMSBY.

Week ending December 14th.

Chemicals (otherwise undescribed)		
Dieppe, 40 pkgs.		
Hamburg, 15		
Dyestuffs (otherwise undescribed).		
Dieppe, 2 cks.		

GOOLE.

Week ending Dec. 11th.

Benzol—		
Rotterdam, 24 cks.		
Terneuzen, 56 drms.		
Bleaching Preparations—		
Rotterdam, 76 c s.		
Chemicals (otherwise undescribed)		
Boulogne, 2 c s.		
Hamburg, 62		
Rotterdam, 1 cs.		
" 160		
Coal Products—		
Cala s, 3 c s.		
" 10 puns.		
Rotterdam, 92 cks.		
Dyestuffs (otherwise undescribed)		
Ghent, 2 cases.		
" 7 c s.		
" 1 drm.		
Hamburg, 105 c s.		
Rotterdam, 2		
Manure—		
Boulogne, 42 bgs.		
Ghent, 216		
Hamburg, 304		
Pitch—		
Antwerp, 232 t.		

beverage for 19. Phosphorus is credited with 11 deaths, and hydrochloric acid or spirits of salt 14. Strychnia or nuxvomica killed 17. Those poisons in least request seem, however, to have been the most deadly—arsenic, mercury, and corrosive sublimate. If we may use the arguments recently urged with regard to the deaths from water gas, we should agitate for the total restriction of sale of all poisonous substances, but here we are confronted with a difficulty, as we find acetic acid or vinegar is credited with one death, alcohol with six, chlorodyne with 10, various fungi with 21, fish with four, improper food with one, decomposed food with four, so that it is quite clear our food stuffs, or those substances known as food stuffs, are as liable to cause death as the veritable poisons. Perhaps those who are so anxious to place all poisons under the especial care of chemists and druggists, will be good enough to tell us what poisons really are, and whether it is not true that nearly all the poisons which people have purchased for homicidal purposes are not, in by far the majority of cases, purchased from chemists and druggists.

THE JARROW CHEMICAL COMPANY.

AN announcement, says the *Shields Daily Gazette* will be found in our news columns to-day which, while it can occasion no great astonishment to those who are acquainted with the chemical trade—for something of this character must have been anticipated for some time past—must be painful to a large number of the inhabitants of South Shields, and will be received with a feeling of regret throughout the whole of Tyneside. The Jarrow Chemical Company has to-day announced to its workmen that it finds itself compelled to close its extensive works at Tyne Dock. The decision, we are happy to say, is not to take immediate effect. There is to be an interval during which the whole of the men engaged at the works will have an opportunity of obtaining new employment. There will be no sudden dispersion. This is not one of those cases in which a large number of men are thrown out of work at once, on a labour market already over crowded. With one exception, all the industries of Tyneside are, happily in a most prosperous condition, and men who find it necessary to seek new employment are not likely to be for any long time out of work. In this instance, and under the circumstances in which the works of the Jarrow Chemical Company are to be closed, the whole of the workmen will be exceptionally well situated for making a new provision for themselves before their present engagement expires. It has happened frequently in the history of our manufactures that by new inventions, or by the discovery of new processes, or by unexpected diversions in the channels of trade, large classes of the population have been driven in some sudden manner to seek new employments. In the present case there are elements neither of suddenness nor of unexpectedness. Those conditions which have been so much to the advantage of trade generally have operated only to the disadvantage of the chemical industry, which has been carried on, if not always at a loss, certainly at a profit which was far from yielding a fair percentage on the capital employed. Quite recently the successful prosecution of chemical manufacture has been hampered by a new condition. It is no longer possible to carry on the other branches of the trade without adding a department for the making of bleaching powder. At the Friar's Gorse works of the Jarrow Chemical Company, bleaching powder has been one of the branches of production. Bleaching powder has not been produced at the works at Tyne Dock. The directors were therefore confronted with a dilemma. They must either, at very considerable cost, and with no certainty of remuneration, make an expensive addition to their works, or take, however reluctantly, the step which is announced to-day. We have good grounds for stating that this step has been taken with the very utmost unwillingness; not until some time after it had seemed to become unavoidable, and with a most generous consideration for the men whose services would have to be dispensed with. The works will not be finally closed for at least some three or four months to come. This is the hopeful feature of the situation. The directors kept the works on throughout the whole of the late period of depression, and they have chosen such a time for bringing them to an end as would be most to the advantage of the workmen in their employment. All classes of the population will witness with sorrow the disappearance of an old Shields industry. It is sixty-six years since the chemical works at Tyne Dock were commenced. For twenty years they were in the hands of Messrs. Cookson, and for the remaining forty-six years they have been in the hands of the Jarrow Chemical Co. The relations of employers and workmen have throughout that long period been of a uniformly agreeable character, and there are men in the works whose fathers and grandfathers were there before them. We feel certain that the directors will not less regret the necessary breaking of these

relationships than will the men whom they have so long kept in their employment. To one aspect of the matter, as affecting the welfare of the borough of South Shields generally, a merely passing reference may be made. The land occupied by the Jarrow Chemical Co. at Tyne Dock is among the most valuable land on Tyneside, and there is no doubt that its position and its other advantages will soon cause it to be occupied by other and more profitable industries, to the benefit of the town and of the surrounding district.

A STUDY OF COAL GAS,

By M. EM. SAINTE-CLAIRE DEVILLE.

(Engineer at the experimental works of the Paris Company.)

(Concluded from page 19.)

DIRECT EXPERIMENTS ON THE INFLUENCE OF HEAT ON THE PRODUCTION OF BENZENE.

I must, however, in this connection, point out that numerous experiments made for the purpose of ascertaining the effect of a high temperature on the production of benzene, have not led to quite such simple conclusions.

I have found that if gas taken at the exit of the meter at the commencement of the charge, i.e., rich, but not tarry gas, be superheated, it requires a very intense heat applied to a slow stream of gas to produce any perceptible difference between the heated and unheated gas. The difference thus produced consists in the loss of about 12 per cent. of its benzene, and of 35 per cent. of its other hydrocarbons, absorbable by bromine, accompanied by the deposition of carbon in the porcelain tube, and production of naphthalene and anthracene.

If, instead of superheating the gas after purification from tar, it be heated together with the volatile products formed during the distillation, the results are the same as regards the benzene and rich hydrocarbons, so that all that can be concluded is that benzene resists a high temperature better than other hydrocarbons. This question as to the relative amounts of benzene formed during the successive periods of the distillation, which is of great theoretical interest, requires further investigation.

However this may be, we know sufficient to be able to affirm that, among all the hydrocarbons which contribute to the illuminating power, benzene is the only one which exists in considerable amount throughout the whole of the distillation.

Experiments carried out on the laboratory scale show that, speaking generally, a high temperature favours its production.

It remains to be learned whether the proportion of benzene depends on the temperature of the coal at the precise moment of decomposition, or on the temperature to which the volatile products are submitted after their formation, during their passage along the red hot walls of the retorts.

RECAPITULATION AND CONCLUSIONS.

The two chief subjects treated in this article are:—

(a) The classification of gas coals according to their elementary composition.

(b) A study of the amount of benzene contained in the gas, and on the part played by this hydrocarbon in affecting the illuminating power of the gas.

I. At the experimental works of the Paris Company, during the last twelve years, 1,012 coal tests have been carried out, 36,000 kilos being employed for each test.

Of these 1,012 tests, 898 have been made with coal from 23 sources, that from each source having been tested on the average 39 times.

The average results of this large number of experiments are therefore free from variations due to accidental deviations from the normal character of the coal, and consequently clearly show the influence of the composition of the coal upon the various properties of the gas, which are of interest to the gas manufacturer.

The basis selected for this classification is the amount of oxygen contained in the coal, which is considered to represent the combined water, and thus to be the best indication of the geological age of the coal and of its degree of carbonization.

By dividing the coals tested into five classes of types, containing increasing amounts of oxygen, from 5.5—12 per cent., and by calculating the average results for each type, the following conclusions have been arrived at:—

As the coal becomes richer in oxygen, the gas produced by its distillation becomes gradually richer in heavy constituents—carbonic acid, carbonic oxide, marsh gas, and illuminating hydrocarbons, and poorer in pure hydrogen.

Its density and illuminating power both increase. It is also to be observed that the proportion of volatile matter, determined by calcination in a crucible, also increases, even when the amount of combined water is deducted.

The volume of coke remaining in the retorts becomes larger as the percentage of oxygen diminishes. The products of condensation (tar and ammoniacal liquors) increase with the amount of oxygen.

Considering the five types of coal, it is found that type III. comprises the best gas coals, those namely which give a rich gas and yet leave a fair quantity of coke of good quality. Types I. or II. give inferior gas, but much coke.

The remaining classes—IV. and V.—give a rich gas, but their coke is small in quantity and of poor quality.

II. The benzene contained in gas may be estimated by simply weighing the products condensed at -22° , and adding to the weight thus found per cubic metre (moist at 15°) a constant equal to 23.5 grms.

I have shown:—

(1) That air artificially charged with a known weight of pure benzene, deposits the whole of this at -70° , and that the amount which condenses between -22° and -70° , is exactly equal to 23.5 grms. per cubic metre (dry at 0° 1760 min.); this number agrees with that calculated from Regnault's numbers for the vapour pressure of benzene.

(2) That gas treated in the same manner, deposits, whatever be its composition, 24.7 grms. of liquid between the same temperatures, from every cubic metre measured dry at 0° 1760 min., which corresponds to about 23.5 grms. per cubic metre, moist at 15° .

(3) That the liquid thus deposited consists of almost exactly 23.5 grms. of pure benzene, mixed with a little toluene, xylene, etc.

Applying this method of determination under very varied circumstances, I have arrived at the following conclusions:—

(a) The average gas of the city of Paris contains 39–40 grms. of benzene per cubic metre, composed of:—

Pure benzene	77
Other hydrocarbons of the aromatic series	23

100

From 7–8% of the weight, and from 1–1.1% of the volume of the gas is therefore made up of benzene vapour.

Independently of benzene, the gas contains 4–4.5% by volume of hydrocarbons incondensable at 70° .

The illuminating power of the gas is found to be:—

Due to benzene	65
„ other hydrocarbons	35

100

(b) The various qualities of gas may be classed in two symmetrical groups with:—

I. Rich, or comparatively rich, gases.

- A. Produced from oxygenated coals.
- B. Obtained by distillation, at a low temperature.
- C. Evolved during the first stages of the distillation.

II. Poor, or comparatively poor, gases.

- A. Produced from coal poor in oxygen.
- B. Obtained by distillation at high temperatures.
- C. Evolved during the last stages of the distillation.

(1) The weight of benzene contained in a cubic metre of gas is almost the same in all six varieties.

(2) The benzene obtained from gases of the second group is a little richer in pure benzene, and, consequently, a little poorer in toluene and cumene, &c., than that from those of the first group. The difference is small but clearly marked.

(3) Rich gases of the first group at the moment of leaving the retort are at a lower temperature than those of the second group, or, to speak more accurately, the temperature of the coal at the exact moment of decomposition is higher for gases of the second group than for similar ones of the first.

We see, therefore, that rise of temperature appears to have the effect of progressively destroying the hydrocarbons of the olefine and acetylene series, and also those of the aromatic series, with the exception of benzene; of producing, or, at least, of not destroying benzene; of producing pure hydrogen; and, finally, of forming naphthalene, anthracene, and graphite.

These results may, therefore, be considered as an industrial confirmation of Berthelot's theories on the subject.

(4) As regards illuminating power, benzene plays a secondary part in very rich gases, an important part in gases of average richness and is almost the sole source of the light given by very poor gases. If the whole quantity of benzene present in a gas be removed by refrigeration to -70° , and the loss of illuminating power thus occasioned divided by the weight condensed (which is almost constant for all gases), it is found that the quotient, which expresses the candle power of one gramme of benzene burnt in 100 litres of gas, is much higher for poor than for rich gases.

The limits actually observed are 0.040 candles and 0.250 candles.

This proves that if, gas itself devoid of illuminating power, be progressively enriched with a hydrocarbon, that the illuminating power of

the mixture increases much less rapidly than its richness in illuminating material.

It is necessary to remark that these facts have only been proved by applying to all gases, rich or poor, the photometric method founded on the use of the Bengel burner.

It would be interesting to study the variation of illuminating power when each gas was burned at a burner suited to its composition, as the Bengel burner is adapted to the average Paris gas.

MANURES FOR POTATOES.

(EXPERIMENTS BY DR. J. H. GILBERT.)

In a former article we shewed that twelve years' experiments, carried out on the same land by Dr. J. H. Gilbert, the renowned English agriculturist, prove that, contrary to the view usually taken, nitrate of soda and sulphate of ammonia produce the best results with potatoes, provided that they are employed in conjunction with superphosphate and salts of potassium.

According to these data, the best fertiliser for potatoes seems to be composed of:—

Sulphate of ammonia	120	kilos.
Nitrate of soda	200	kilos.
Superphosphate	600–800	kilos.
Potassium	100–200	kilos.

In clayey soils a certain proportion of the superphosphate may be replaced by phosphate. In a second communication, Dr. Gilbert, summarising experiments also carried out during 12 years, shows that ordinary manure employed by itself never gives results equal to those obtained by the use of mineral fertilisers or of manure, to which mineral ingredients have been added.

As a mean of the 12 years, manure alone produced only 4,200 kilos. per acre, while 5,150 kilos. were got with manure mixed with mineral fertilisers, and 6,742 kilos. by the aid of nitrate of soda and sulphate of ammonium, mixed with phosphate and potassium fertilisers.

These facts are due to the rapid absorption of mineral fertilisers, while ordinary farm manure is not sufficiently rapidly decomposed to produce its effect on the crop of potatoes. In discussing the results of his experiments, Dr. Gilbert shows that the potato is unable to avail itself of the nitrogen supplied to it unless there be present in the soil a sufficient quantity of mineral matter, and hence proceeds the necessity of employing large amounts of phosphoric acid. Phosphoric acid also facilitates the absorption of potassium by the plant. One of the effects of superphosphate applied to spring crops is to increase, to a large extent, the development of superficial nourishing roots. It also appears that under the influence of superphosphate, which is exerted both on the plant and the soil, the potato becomes better able to absorb a large amount of potassium.

When the potato has mineral matter at its disposal, it is able to do with less nitrogen than any other vegetable. The main factor in its cultivation seems, therefore, to be phosphoric acid. The farmers of Merville, a district in the neighbourhood of the Nord, where the potato is the chief article of cultivation, have always obtained good results by the use of Peru guano, on account of its richness in phosphoric acid and nitrogen. The fertiliser now employed with good results in this district contains 9% of nitrogen, 6% of phosphoric acid, and 5% of potassium. The proportion of phosphoric acid here is hardly sufficient, but it must be remembered that the lands are now rich in phosphoric acid, guano having been constantly employed for 25 years.

Many countries, however, maintain the practice of using large quantities of ordinary manure for potatoes, and even of spreading this manure among the tubercles themselves. It seems probable that, apart from its richness in constituents of every kind, the beneficial effect produced by manure is chiefly due to the alteration in the physical character of the soil introduced by its use, for it renders the earth porous, and thus enables it to be penetrated by the superficial roots on whose development the success of the crop so largely depends. We ought, perhaps, also to attribute some part of its good effects to the rise of temperature produced by the decomposition of the organic substances contained in it, and to the carbonic acid which it evolves, and which, thanks to the moisture present, renders soluble the mineral constituents of the soil.

Tendencies to disease are naturally more pronounced with very rich, nitrogenous manures, the potatoes obtained being less dense, and more watery, than those grown in land which has only received moderate manuring. The character of the season always plays a part of the utmost importance with respect to the quality of the crop, and the diseases to which it is liable. Dry years, as everybody knows, are the most favourable, damp years the most disastrous to the potato harvest. —*L'Engrais.*

McDOUGALL'S PATENT MECHANICAL STOKERS.

McDOUGALL'S PATENT MECHANICAL STOKERS.

WE do not think it necessary to apologise to our readers for making a few remarks on boiler-firing in general, and a mechanical stoker in particular. The steam raiser is at last beginning to open his eyes to the fact that, if he wishes to keep abreast with the times, and live in peace and good-will with his neighbours, he must discard the old haphazard system of slovenliness, and avail himself of the resources that modern progress puts within his reach. To dwell upon the folly and wastefulness of employing men whose only qualification for their post, is an unfitness for anything else—to point out the loss in evaporative power obtained from the fuel employed—to lament over the clouds of black smoke reeking from the chimney of the mismanaged factory, to do all this would be to tell an already too oft told tale, and we turn with pleasure to the brighter side of the picture.

Very little study of the subject is necessary to show that the chief points to be attained is a complete combustion of the cheapest quality

fixed on a shaft beneath the front of the grate, the construction being such that they are pushed in altogether, and are drawn out again in sections. By this means the fuel is slowly carried towards the rear end of the grate, and, as combustion is completed by the time the bridge is reached, only clinkers and ashes remain to be here delivered on to the bottom of the flue, whence a door, specially fitted beneath the bridge, allows them to be raked out at convenience. It will be at once seen that by this arrangement the clinker has very little chance of "settling" on the bars; and as the rich vapours distilled from the newly-charged fuel, mixed with air, have no pass over the incandescent mass at the back of the grate, the chances of their passing away unconsumed are reduced to a minimum. Where very heavy work is required from the boiler the advantage of the air-blast is very pronounced, and its low cost enables the makers to recommend its addition to the stoker in all cases. In this, as in the other form of the apparatus, the mechanism is of the simplest possible description, and no springs or tappets are employed.

The advantage of the mechanical stoker was recently shewn by a

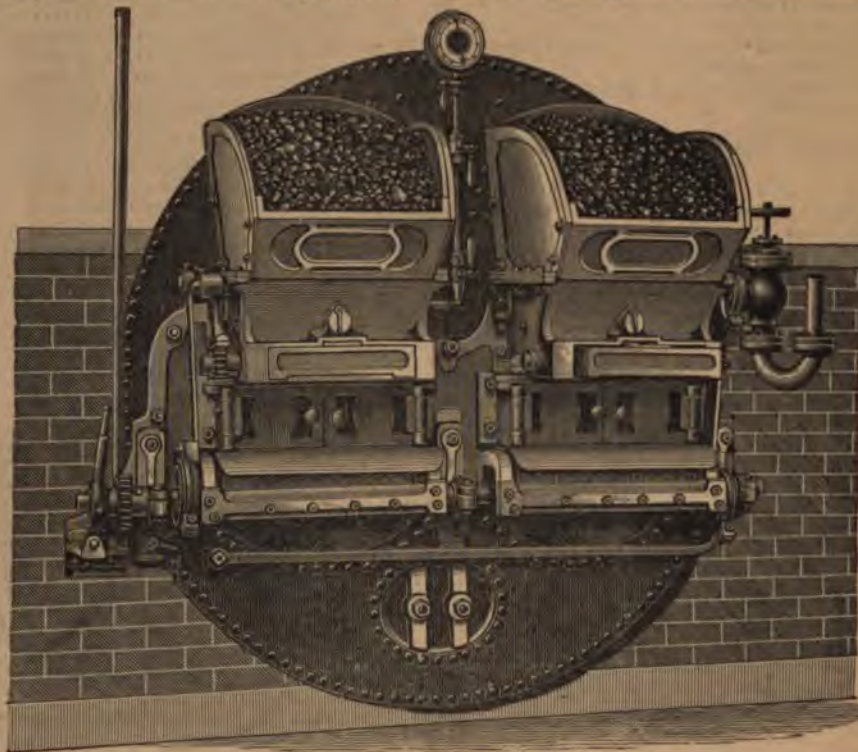


FIG. 1.

of fuel. This is a comprehensive object to aim at, and includes all those minor features which enable the manufacturer of the mechanical stoker to make out such a good case for his apparatus. For, with complete combustion, black smoke is a thing unknown, and unburnt coal is not to be found among the ash and clinker.

The McDougall Patent Mechanical Stoker is made by the Chadderton Iron Works Co., Ltd., of Chadderton, near Manchester. The stoker proper is made in two forms, the variation being intended to meet difficulties arising from differences in the burning quality of the coal, as Mr. McDougall, after twenty years' experience in the matter, is strongly of opinion that no one form of mechanical stoker is adapted to deal with all the varied qualities of coal. This is only what could reasonably be expected, and failure to realise the fact is responsible for much disappointment and vexation.

The form most strongly recommended, where a soft and clinkering coal is used, is that styled by the makers "The Level Reciprocating Bar Arrangement" (fig. 1). Combined with their patent air blast it represents their latest and most improved system of stoking, promotes a most vigorous combustion and effectually prevents the formation of smoke. In this arrangement a ram, situated at the bottom of the hopper, distributes the fuel evenly and regularly over the front part of the grate, and the bars are kept in constant motion by a series of cams

comparative test made at Millwall Docks by the engineer, Mr. F. E. Duckham. It reduced the coal bill by a trifle over 25 per cent., by allowing "small" coal at 11s. 3d. per ton to be used instead of "hard steam," at 15s. 3d., the work done per pound of coal being practically the same in both cases, but, if anything, slightly in favour of the cheaper quality.

It should be mentioned that if at any time it is desirable not to use the stoker, the disposition of parts is such that the fires can be charged by hand in the ordinary way.

The second form of the mechanical stoker is designed for cases where the load is fairly constant, and the fuel a hard one, which does not clinker. It is somewhat cheaper than the first type, but has already stood the test of several years, with the most satisfactory results. Instead of a ram, an inclined step introduces the fuel on to the coking plate, and the firebars, instead of being moved on the level and actuated by cams, are driven from an eccentric shaft, and, in addition to a reciprocating motion, have an alternate rising and falling motion. The effect is the same as in the No. 1 arrangement, the fuel being carried steadily rearwards, and the clinker, being prevented from attaching itself to the bars, is finally deposited with the ash at the bottom of the flue for removal, as above described.

In this case, also, hand-firing can be resorted to, if circumstances at any time render it necessary.

Recognising the fact that a mechanical stoker might, under certain circumstances, be undesirable, or its use impracticable, Mr. McDougall has also given his attention to hand-firing, and has brought out a system of continuous moving bars, shown in figs. 2 and 3, which will go far towards compensating for the faults and failings of the fireman. These automatic moving bars obtain their motion in a very simple and effective manner from a series of eccentrics working on a shaft placed

the putting aside of a mass of incandescent fuel to re-start the fires after clinking or cleaning. The price of this apparatus is very moderate, compared with the advantages in economy and convenience to be derived from its use.

We think, with Mr. McDougall, that before one or other of the three mechanical arrangements above described all ordinary difficulties connected with the consumption of solid fuel should vanish, and we have no doubt that the genius of the inventor, with the skill of the makers, can successfully cope with any of those special obstacles which do not

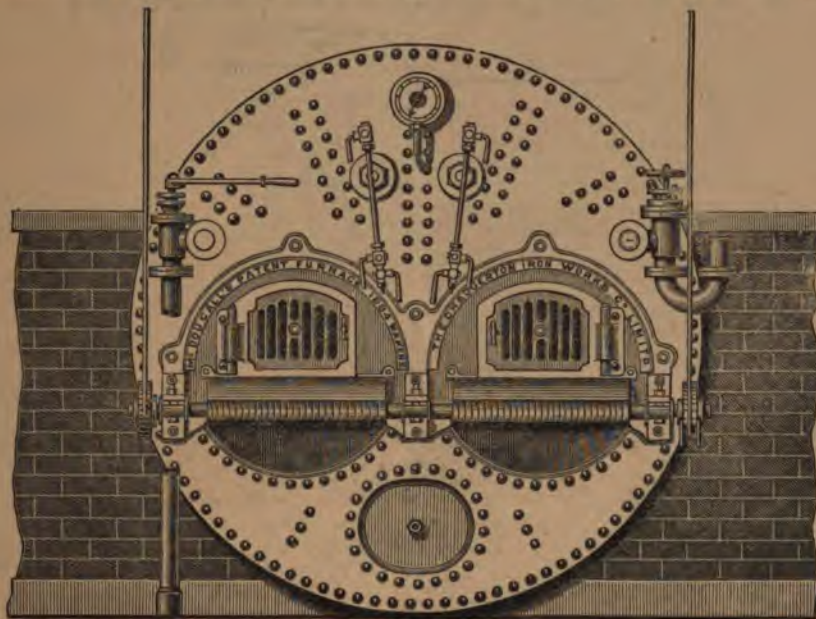


FIG. 2.

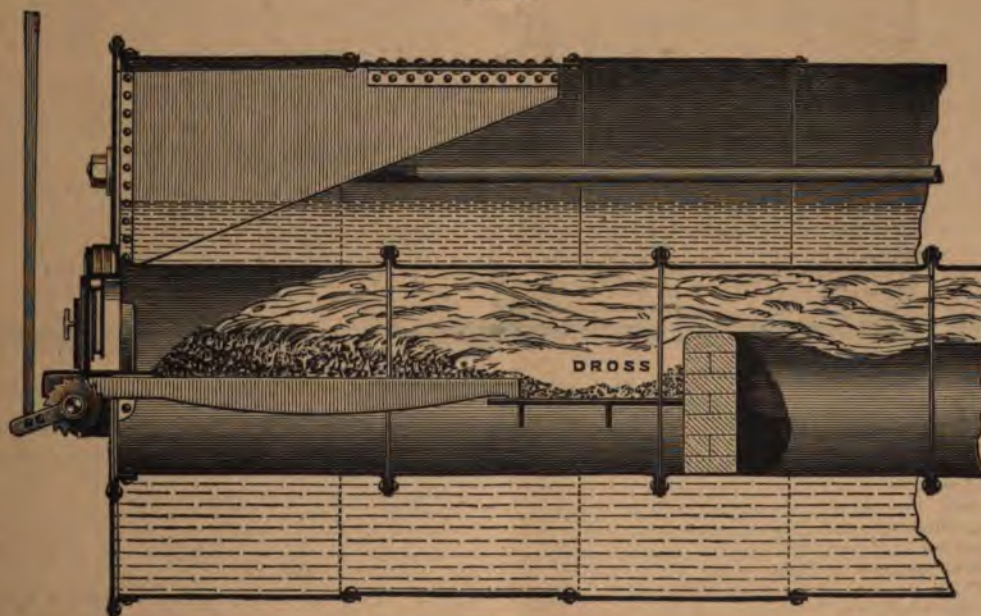


FIG. 3.

beneath the front of the fire-grate, and move in suitable jaws provided for their reception in the ends of the fire-bars. By these means the bars receive a continuous and even motion, and the arrangement of the eccentrics being only alternately uniform, each bar moves in a direction exactly opposite to that taken by the bars next adjacent. In this way the adhesion of clinker is effectually prevented, the bars are protected from burning, and the air spaces kept clean and effective. Behind the fire-grate, and at the same level (see fig. 3), is situated an open space or chamber, bounded on the side farthest from the front by the fire-bridge. This space forms a kind of combustion chamber, and can also be utilised for

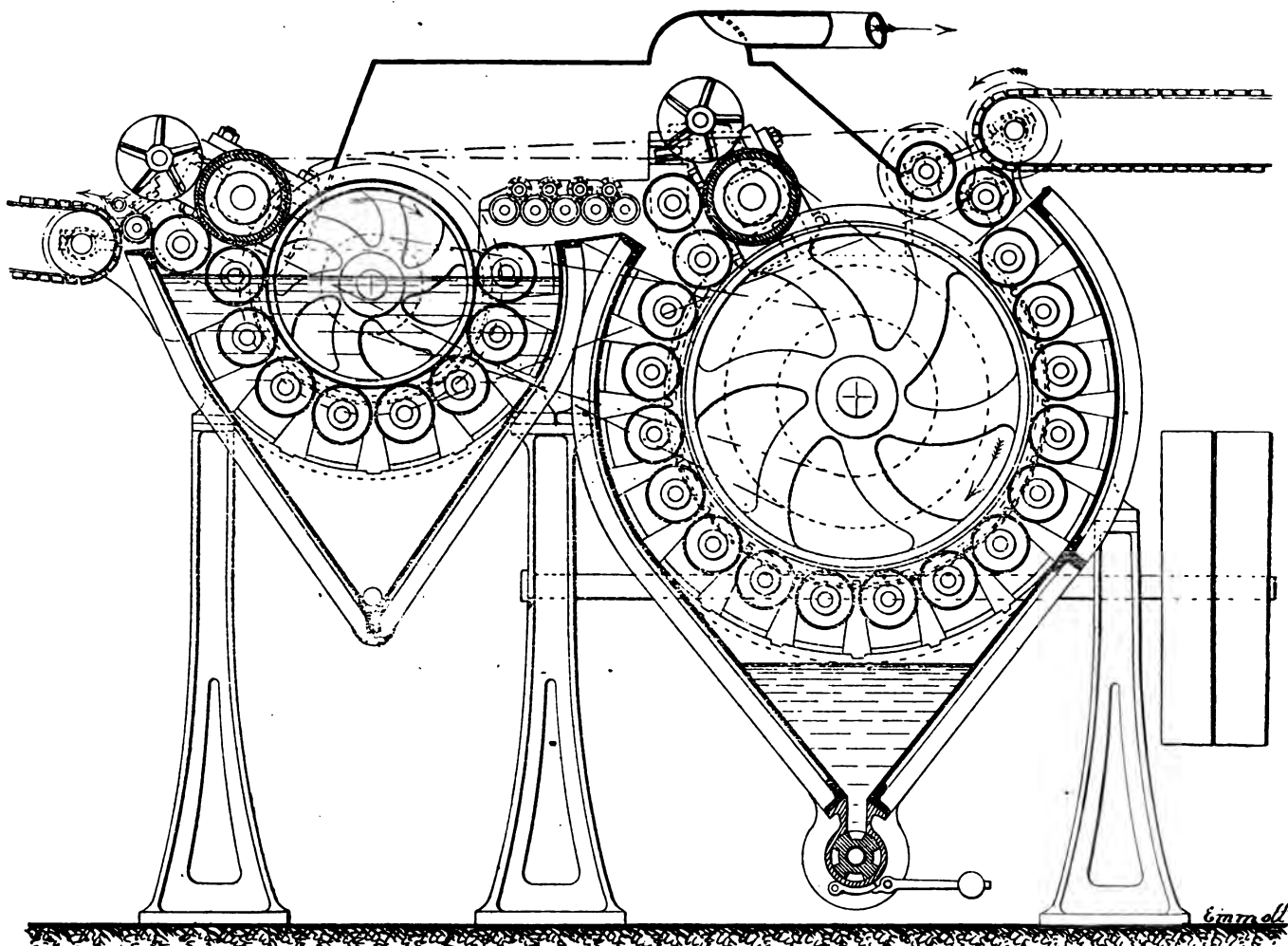
come under the head of everyday experience.

We are very pleased to learn that these mechanical devices for securing a more scientific and economical use of fuel are coming more and more into fashion day by day. The period of depression through which we have just passed has done much to minimise wastefulness of every kind and degree, and in few cases has this beneficial result been more pronounced than where the combustion of fuel is concerned. But as yet, we stand only on the threshold. Practice is never perfect till it is made to harmonise with true theory, and how far we are from attaining this is only too deplorably manifest to those who know what

a pound of fuel *might* do, and what it *does* do. Every nearer approximation to the attainment of this harmony is a step in the right direction, and we hail the appliances of which we have been treating as a means towards this end. The boiler shed is the starting point of the factory or workshop. Here is *the* place of all others where the

principles of economy should be studied and put into force. We hope that the year 1890 will see a yet wider introduction of the McDougall Patent Mechanical Stoker, and that twelve months hence we shall be able to chronicle still greater triumphs for its energetic patentees,

A NEW WOOL-SCOURING MACHINE.



Messrs. Pullan, Tuke, and Gill, engineers, of Leeds, have just constructed a machine for wool-scouring on the solvent process, which promises to have a marked effect on an important local industry. The machine is the invention and patent of Mr. George Burnell, of Leeds. Mr. Burnell is a native of Otley, and has had some 40 years' experience as a wool-scourer in the colonies. The emulsion method of wool-scouring, by which the grease is washed out with an alkali, is just now almost universally used, and a high stage of perfection has been reached in the process, but it is a system that possesses many disadvantages, and much attention is being given just now to the solvent method, by which the fat is dissolved in a liquid. Mr. Burnell's machine, roughly speaking, is divided into two parts, or V-shaped tanks. The first, or large tank, is devoted to the process of freeing the wool from grease, the second, or smaller tank, ridding it of the potash soaps that remain after the first operation. The working parts of the large tank consist of a central revolving drum, 40 in. in diameter, surrounded by 16 smaller compressing rollers, so arranged as to press the wool against the large central roller, or, if necessary, to yield and permit different thicknesses of wool to pass through. The solvent used is petroleum-benzine, and the first tank is filled with water (in continuous flow) up to the bottom of the rollers, the remainder of the tank, up to the nip of the highest small roller containing the benzine. The wool to be treated is fed in at the top of the tank, on the right-hand side. It passes into and is saturated by the benzine, and is then compressed between one

of the small rollers and the large drum. On escaping from the rollers it again becomes impregnated by the benzene (which does not, like the water, render it clammy, but allows it to expand), and passes on to the next roller, passing around the large drum in this way. The action may, in fact, be likened to holding the wool in the hand, dipping it into the benzene, and then squeezing it out, and repeating the action a succession of times. The benzene dissolves the wool fat, which it thus removes from the wool, and the dirt attaching to the wool by means of the fat is also set at liberty, and drops through the solvent and water on to a grooved roller at the bottom of the tank, and thus escapes. While the wool is fed into the tank from right to left, a continuous flow of pure benzene is fed from left to right, so that the crude wool meets the dirty or saturated benzene on entering, and is immersed in the pure benzene when leaving the tank, after having had the fat extracted. The saturated benzene passes out at a point just below where the wool enters to a receiver, is distilled, and returned to the tank in its pure state to be used again, a continuous supply thus being kept up. Just before emerging from the first tank the wool passes through wringing rollers, is squeezed, and then conveyed to the second tank, which contains water at a suitable temperature. It is there subjected to a similar process to that of the first tank; the potash and other impurities are thus removed, and the wool, after receiving a final compression, is conveyed by an endless band to the drying chamber. The potash soap liquor that remains is led away to a vapour tank, and the carbonate of potash recovered in the ordinary manner. The machine can also be

used for cleansing piece goods from oil or grease left in after manufacture. An element of danger in the process is the volatile and inflammable nature of petroleum-benzine employed as a solvent, but the machine is covered by a galvanized iron hood, which enables it to be drawn off when it is condensed and used over again. It is claimed, too, that benzine, unlike disulphide of carbon, which is largely used in some processes, is not poisonous, and further, that by the process the wool is washed perfectly, and is not torn or tangled in any way. This machine was built by Messrs. Pullan, Tuke and Gill, but is now being removed to the Neville Works, Elland-road, the new premises of Messrs. Henry Tuke and Co., which are more convenient for working and exhibition of the machine, which will be ready in about a fortnight.

LECTURE ON WOOL-SCOURING BY PROFESSOR HUMMELL.

On Friday, the 20th ult., Prof. Hummell, of the Yorkshire College, lectured before the members of the Society of Dyers and Colourists, in the Bradford Technical School, on the subject of "Wool-scouring with volatile liquids." Dr. Knecht, head master of the school, presided, and there was a good attendance. The lecturer said that no operation to which wool or woollen material had to be submitted by the manufacturer was of greater importance than that of scouring. It was the first operation raw wool was subjected to, and if inefficiently performed, it gave rise to endless troubles, both to the manufacturer and the dyer. The ultimate fabrics had possibly a clammy or harsh feel, and were void of lustre, or the colours were poor and irregular, and lacked brilliancy. Further, in the form of yarn or cloth, wool had invariably to be scoured a second time to remove the oil introduced by the spinner. It was very necessary, therefore, that the scouring process should be as mild as possible; that was, while it should efficiently remove the yolk or oil, it should in no wise injure or felt the fibres. At the present time they knew of only two distinct methods of scouring wool—the emulsion method and the solvent method. The first, and most usual, method consisted in washing the wool in a warm and dilute solution of some weak alkali, or alkaline salt; as, for example, carbonate of soda, soap, &c. The fatty matter was broken up under the influence of the alkali, and formed an emulsion, and in this manner was removed. The second method consisted in treating the wool with some liquid which would dissolve the fatty matter from the wool, and it was well to bear in mind that in the case of greasy wool the potash soaps must be separately removed by a separate treatment with water, since these fatty solvents were not good solvents for potash soap. Contrasting the advantages and disadvantages of the two methods, he remarked that the emulsion method had in its favour the prestige of long-established and universal usage. The agents employed were inexpensive, and no danger was incurred. Further, by a long process of evolution, the engineer had at length supplied a form of apparatus which was all but perfect in its action, and which enabled the scouring to be performed in a continuous manner. The disadvantages of the emulsion system were as follows:—First, the agents used had an injurious action upon wool, and slight though it was, it might be materially increased by inattention on the part of the workmen to the temperature and concentration of the alkaline solutions employed; second, the scouring agents were wholly or partially lost, and could only be recovered by tedious processes, and in altered form; third, the necessity for invariably employing water, and the difficulty of having it noncalcareous, thus giving rise to the precipitation of injurious lime soaps on the wool. The advantages accruing to the solvent method of scouring wool seemed to be as follows:—The possibility of employing an agent which had not a deleterious action upon the fibre, the ease with which the operation might be made automatic and independent of the carelessness of workmen, the facility with which the solvent could be recovered in its original form with but small loss, the facility, too, of recovering the waste products of the wool, the absence of the necessity of employing water, especially in the case of yarn and cloth, together with the possibility of lessening the amount of water required in the case of scouring raw wool. The apparent disadvantages the solvent method had to contend with were its novelty, so far as actual practice was concerned, attending it, and, most of all, the absence of any apparatus which had been proved by long usage to answer every requirement. Any one who carefully considered all the pros and cons of the two methods thus briefly sketched could not but conclude that if they only had the proper apparatus the solvent method would, in the end, be the cheapest and best, and would be universally employed. The chemist had already supplied a choice of more or less suitable solvents, and it remained with the engineer to invent and construct some suitable apparatus by which to apply them. He then gave a *resumé* of the chief mechanical arrangements which had been proposed from time to time since the year 1856, in order to apply volatile liquids as scouring agents for wool, including carbon-disulphide, alcohol and ether, fusel-oil, toluene, and petroleum-benzine. The chief portion of his lecture was devoted to a description, with the aid of lantern slides, of the various machines invented and constructed to work the solvent method—the inventors being Deiss, Leyflerth, Moison, Lunge, Heyl, Van Haacht, Richter, Braun, Mullings, Thomas, Cox, C. W. Smith,

Patry (E. De Pass), Owen, Singer and Judell, and lastly that of Mr. G. Burnell. In the course of his description of the various machines, he mentioned that one fatal objection to many of the processes was the use of carbon-disulphide, which, under certain conditions, coloured the wool yellow. From the fact, he continued, that four machines for scouring wool by volatile liquids were brought out during 1888, it seemed as though the time was now ripe for making a vigorous attempt to introduce the solvent method of scouring. They lived in a day of the utilisation of waste products, and it ought certainly to be taken into account in connection with the wool-scouring industry. He shewed that if the potash liquor, which was one of the residuals, was treated in an ordinary gas retort, they would get a certain amount of illuminating gas. There then remained the coke, which would furnish crude carbonate of potash, and this being free from soda would be especially useful to glass manufacturers. From wool fat they got lanoline, which was used as a salve when mixed with medicaments, and it seemed it was very readily absorbed into the skin. Then wool fat was used in a crude condition for lubricating heavy machinery, and might be used for other purposes. Its future uses really had to be found out. They tried at the Yorkshire College whether it was suitable for candles or night-lights, but it gave a smoky flame, and did not burn very brilliantly. He then shewed that under the present system the waste soap liquors had to go through several processes by different manufacturers before coming back to the wool-scourer. By the solvent method the solvent was recovered at once, and made use of again in the process.

Mr. Slatyer alluded to the danger attending the solvent methods on account of the inflammable nature of the agents, and suggested that the colouring of the wool in the carbon disulphide process was perhaps due to the presence of free sulphur. He suggested that if the bye-products were utilised as mentioned their value would be very greatly diminished, for a time at least.

Mr. Beckett thought that, although in the first tank the wool would not wrap round the rollers because of the benzine, still, in the second portion of the machine, when it went through water, it would be liable to wrap round.

Mr. Burnell said that, with regard to the second part of the machine, the grease had been extracted when it reached there, and the wool did not adhere to the rollers.

Mr. Wilkinson said that while the liberating of the fat caused the dirt to drop from the wool, it would drop on to other rollers beneath, and particularly so on the ascending side of the tank, and that therefore the wool must retain some dirt.

Mr. Burnell observed that all dirt that remained after passing through the second tank could be got rid of by simply shaking the wool. In reply to further remarks, he said that the machine could be worked for a halfpenny per pound. He pointed out that by the other processes the agents had to be constantly renewed, but that in his machine the agent was used over and over again. The loss in condensing the benzine was only 5 per cent., and the cost of condensing was 2d. a gallon, so that if they took the bye-products into account they had the scouring done for nothing, and would get a profit from the products.

It was pointed out that the Burnell process cleansed the wool at one operation. In the Singer and Judell process the wool was treated twelve times.

The Chairman said the discrepancy might be accounted for by the fact that in the Burnell machine, in passing through the sixteen rollers, the wool got sixteen dips and sixteen squeezes. Of course, in the Singer and Judell the wool went through twelve successive tanks containing the pure agent, while in the Burnell machine it merely went through successive strata which might or might not be in a state of purity.

THE SUBSIDENCES IN CHESHIRE.—The Salt Union directors, as the result of their conference at Crewe with the members of the Northwich and Winsford Local Boards, have forwarded to the two Boards a list of questions, to which answers have been appended, and the document returned to the Salt Union. The questions are framed on the assumption that the land subsidences in Cheshire have been caused by the pumping of brine by the Salt Union and their predecessors, and that compensation should be paid in respect of damage resulting therefrom. The Boards propose that compensation should be paid to non-receivers of brine royalties (but not to royalty receivers or their tenants) within the area covered by the bill of 1881. Any works using brine are to be excluded, as well as railways, rivers, canals, and bridges. Compensation to the extent of 1d. a ton or 1d. per 1,000 gallons of brine pumped is only demanded for future damage, the distinction between that and past damage to be determined by a general survey; no further applications to Parliament for increase of compensation to be allowed for ten years. The Boards, in answer to the question whether since 1881 anything has occurred to alter the right to compensation for damage, assert that prices have been largely increased, and that public opinion has greatly altered, the right being now admitted by most of the opponents of the Bill of that year.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- MAGDEBURG.—We shall be pleased to receive essays from every part of the world.
- B.—Thanks for your communication. It will, no doubt, be interesting to some of our Yorkshire readers.
- R. C.—We do not believe any such process possible.
- J. F. S.—The varnish might be useful for rigid steel goods, but scarcely for wire. Try it.
- D. R.—The numbers were posted as usual. Your copy should have been delivered on Saturday morning.
- J. D., AQUA, ENERO, AND H. J.—See reply to D. R. You should make some allowance for New Year's week.
- CONFECTIONER.—The one named, and all similar essences, are artificial. 2. Whether harmless or not, we cannot say.
- WATER GAS.—You are quite correct, there have been more deaths from coal gas than from water gas. 2. True, but people should not be so fond of handing over their money to these company mongers, without they wish to lose it.
- S.—We are much obliged for the information contained in your favour of the 2nd inst.
- PLANT.—Iron borings wetted with a weak solution of sal ammoniac.
- BENZOL.—Yes, there are six carbonising plants now at full work.

THE JARROW CHEMICAL COMPANY.

PROPOSED CLOSING OF THE WORKS AT TYNE DOCKS.

THE Directors of the Jarrow Chemical Company, Limited, have announced to their officials and workmen their intention of gradually closing their Alkali Works, at Tyne Dock, South Shields, as soon as their existing engagements and contracts will permit. They will continue to carry on their works at Friars Gorse, Gateshead, as these are fully equipped for the manufacture of bleaching powder, and the recovery from soda waste by Chance's new patent process. The alkali manufacture cannot now be profitably carried on, except in connection with the production of bleaching powder; and the Directors did not feel warranted in embarking the capital necessary for the erection of bleach and sulphur recovery plant at the Jarrow Chemical Works. These works occupy one of the most valuable sites for commercial and industrial undertakings in the North of England, adjoining the quays of the Tyne Dock, with all the facilities for landing and shipping of materials and goods, and exemption from dock dues secured by the Tyne Dock Act. The directors believe that the premises will not remain unoccupied, but will still contribute to the trade and industry of the town and neighbourhood.

The following intimation of the intention of the directors has been issued to the workmen to-day:—

The directors of this company think it their duty to give the earliest intimation to the various persons in their employment of a resolution at which they have arrived with regard to the South Shields works of the company.

Formerly their industry depended on the manufacture of alkali and soda, and, until the last few years, it was possible to carry on the works without the manufacture of bleaching powder. This is no longer the case, and the directors have had before them the alternatives either of embarking a large amount of fresh capital in bleaching powder plant, as they have done at the Friars Gorse Works, or of discontinuing the manufacture.

The present prospects of the chemical trade do not seem to them to warrant such an outlay, and they have with much regret come to the resolution to close the works at South Shields when they have completed their existing engagements and worked up their stocks in process of manufacture.

The directors look back upon the very harmonious and agreeable relations which have subsisted between the company and the work people, and which, along with the skill and steadiness of their workmen, the intelligence and attention of their foremen, and the zeal and loyalty of all their officials, have contributed so much to the success of their business.

It is a considerable mitigation of this change that it takes place during a period when the demand for labour is larger than for many years past, and when new employment is more easily to be found.

In a public point of view there is also a mitigation of the closing of these works in the circumstance that they occupy an admirable site, one of the best in the country, available for any kind of commercial and manufacturing industry, and possessing the immense advantage of contiguity of the quays of the Tyne Docks, with valuable rights of landing and shipping raw materials and goods, and exemption from dock dues secured by the Tyne Dock Act. The directors believe that the premises will not remain unoccupied, but will still contribute to the trade and industry of the town and neighbourhood.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing water aqueous hydrochloric of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples. On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish, or Italian.

TIN PLATE WORKS IN FRANCE.

SOUTH Wales has a rival in France—in a district which may be described as one of its own kin. In the valley which is called "Kerglau" which in the Breton language signifies the "Village of Rain," and which is about two miles above Hennebont, a little seaport four and a half miles from l'Orient roadstead, there is a manufactory of tin plates. The *Australian Mining Standard* has a description of them. During the first year the production of sheet iron and tin plates was about 900 tons per year. In 1885 it reached 10,000 tons, and at present it exceeds 12,000 tons. At the same time, the little port of Hennebont, formerly almost completely deserted, frequented only by some fishermen, became very important. All the crude materials necessary for the manufacture come by ship to the locality. The materials are discharged in the port, unloaded in barges which ascend the Blavet, or towed by steam or horse-power to the quays of the factory. The chief crude materials employed are coal, which comes direct from England, there being consumed on an average 70 to 80 tons per day, pig iron, scrap iron, carbonate of lime, magnesia, china clay, tin, grease, chloride of zinc, and the acids used in the manufacture of tin plates. About 700 workers of both sexes are employed in the works, and the motive power used is about 1,000 horses, one quarter of which is supplied by a turbine fed by the Blavet, the remainder by different steam engines. The work of the factory may be classified into five principal parts:—(1) the manufacture of the pig and scrap iron into steel ingots; (2) the manufacture of the ingots into bars and thin sheets; (3) the preparation of the sheets for the process; (4) the manufacture of the tin plates; (5) the decoration and stamping of the tin plates.

The manufacture into bars and sheet employs about 300 workmen, and brings into play almost the whole of the motive force. The steel ingot is first drawn into bars, and then into thin sheets or black iron. The steel ingots are heated in re-heating furnaces, and then taken to a steam hammer, which shapes them and cuts them into two. The pieces are heated over again for half-an-hour, then passed to the bar trains, of which there are three. The bar train is an ordinary rolling mill, which draws the iron out, making bars from 20ft. to 23ft. in length 4in. wide, and 0.4in. in thickness. These bars are at once cooled by immersion in water, and cut into small lengths of from 8in. to 12in. in length, according to the length of the sheets to be made. These steel strips are taken red-hot to annealing furnaces, and then

rolled by means of plain cylinders. On attaining a certain length they are folded into two by means of a special machine and again heated. They are then once more rolled to stretch them further, but two sheets are now rolled together, the first sheet having been folded into two. By other similar successive operations they are folded into fours, and then into eights. A bundle is thus obtained, which is taken to the shears, where the desired dimensions are given; finally, the eight sheets are separated with the aid of a sword bayonet. When the cooled sheets do not separate, this is due to the iron being of a bad quality. The crude sheets thus obtained are put into rectangular cast-iron boxes furnished with a covering. These boxes are introduced into the lower part of the annealing furnace, and after a sufficiently long exposure to heat, the sheet is withdrawn from the boxes and put to cool. The object of this operation is to take away the traces of the cold hammering. The sheets are then passed under a series of cylinders of polished steel, where they are brightened, and they are the black sheets placed on the market.

The sheets are then dipped into large tubs containing water and sulphuric acid. Hydrochloric acid or nitric acid may also be used. At Hennebont from 5,000 to 6,000 kilogrammes of sulphuric acid are used per day. The sheets are put to harden in the acid bath for some minutes, and are then passed to the plating department. Formerly, when the sheets were not so well prepared, and were made of iron of an inferior quality, the dipping demanded more complicated manipulation. After hardening in the acid, the sheets had to be heated in a furnace to a dull red heat, then hammered to remove the oxide, then passed to the hard rolling mill, and lixiviated for 12 hours in water with bran, agitated again in an acid bath, rubbed with oakum and sand, and finally kept in water. At present all these operations are dispensed with. The steeping in acid water and the cleansing are performed rapidly by the aid of steam power.

The process of plating is the same at Hennebont as elsewhere. The tin bath is composed of equal parts of block tin and alluvial tin, a small quantity of copper being added. With regard to alluvial tin, it is time to recall to mind that the whole coast of Morbihan contains lodes of oxides of tin, but too rare and too much scattered to be worked. The shafts at Piriac, sunk at Castelli, opposite the tomb of Almanzor, have been filled in long ago. But the lodes corroded by the waves produced a stanniferous sand which some people explore even at this day. Tin, if mining operations are well directed, will probably become a source of future wealth for these districts. After dipping, the plates pass through a bath of boiling grease, then one of melted tin containing a little chloride of zinc. On coming out of this bath, the plate is brushed and subjected to a second plating similar to the first. The plates are then distributed to women, who put them in chopped rice-straw and rub them with pads of wool. The tin-plate is then finished. Some of the tin-plates are put into the market; others are taken to the printing works. This special manufacture of plating gives employment to 160 workpeople, men, women, and children, divided into 19 plating yards, producing from 500 to 600 boxes of tin-plates per day. Two furnaces for refining tin and one for annealing the tin ashes are included in the yards of the plating works. The decoration and stamping carried on at the works since 1868 is of great service to the manufacturers of preserved foods for ornamenting their boxes. Ten improved mechanical presses enable the lithographer to do the writing and the design on the spot upon the stone, which considerably shortens the work. The factory employs for this purpose draughtsmen, compositors, lithographers, writers, &c.

HISTORY OF THE JARROW CHEMICAL COMPANY.—The Jarrow Chemical Works were founded on the shore of Jarrow Slake, under the name of the Jarrow Alkali Works, by Messrs. Cookson in 1823, and were carried on under this name and by this firm for twenty years. After Messrs. Cookson gave up the manufacture of chemicals in 1843, when the works were laid idle, the business was resumed by Mr. James Stevenson, of Glasgow, Mr. William Stevenson, of London, Mr. J. C. Williamson, of Hull, and Messrs. Charles Tennant and Company, of Glasgow. All these interests continue to be represented in the present company by heirs and representatives of the original partners. The company acquired the extensive works at Friar's Gorse about thirty years ago. These, as will be observed from the intimation given in another column, are still to be kept in active operation. The Friar's Gorse works have been almost entirely reconstructed since they came into the hands of the company, and have been fitted up with all the latest improvements in the plant for the manufacture of bleaching powder and for the recovery of sulphur from soda-waste. The new patent process of Mr. Chance is now in use at these works.

RUBY MINES.—Information has been received from the superintendent of the Ruby Mines, of Burmah, to the effect that the road from the Irrawaddy River to Kyatpin, the headquarters of the mining district, is at last completed and open for traffic, and that labour is plentiful and prospects encouraging. The impracticable state of this road during the rainy season has hitherto proved the chief obstacle to the commencement of active operations and the transport of machinery.

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

In the alkali trade there is an upward movement in prices both of soda ash and caustic soda, the latter being particularly firm, and makers as a rule are indisposed to bind themselves on sales for forward delivery even at a premium upon present values; 70's on the spot are worth £7. 10s. at makers' works. Soda ash is firm at 1½ f.o.b. for good brands of carbonated ash and 1¼ for caustic ash. Some of the leading brands both of ammonia and Leblanc soda ash are now quoted 3½d. per deg. above these prices. Bleaching powder is firm for prompt deliveries, at £5. 5s. f.o.r. makers' works, and maintains a strong position for forward deliveries, £7. 7s. 6d. to £7. 10s. having been paid during the past week. For export, £7. 15s. is nearest price to-day f.o.b. Chlorate of potash rather firmer, and more business doing at 4½d. to 4¾d. Sulphur in all grades as now produced from the "Chance" recovery process is well sold. Vitriol still continues in good demand, and prices are without change. Sulphate of copper is moving freely at £23. 10s. Lead acetate and nitrate are only in moderate request, though prices continue firm and without likelihood of giving way owing to the firmness of the lead market. Acetates of all kinds are in slightly better demand for spot delivery, but very little doing beyond this except in grey acetate of lime, which has been sold freely, and is value for £14. per ton both for prompt and forward delivery. Brown acetate of lime £8. per ton. Acetic acids in all qualities and acetate of soda are slightly improved. White powdered arsenic is in good request for home and export trade. Citric and tartaric acids are quiet. Oxalic acid irregular; prices varying from 3d. to 3½d. There is a firmer tendency in potash, carbonate, and caustic, and demand is good. There is some uncertainty at present as to the future of iodine. Negotiations are on foot for renewal of the combination, but it is yet uncertain as to the outcome and, meantime, price is nominally 8d. to 9d. per oz.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Makers have been in a greater hurry to resume after the holiday than for many a New Year past, and some of the works closed for the two first days only. All were restarted by yesterday morning, and the transaction of business on the market is by to-day back to about its normal swing. The opening is very cheering in character, demand for most articles being on the mount, and prices rising as a general rule. The alkalies continue to mend, and bleaching powder is now getting some shillings over the recent very deep bottom. Caustics, alum, soda crystals, and chlorate of potash, are also all on the rise. Sulphate of ammonia is a trifle easier for prompt Leith, value to-day being no more than £12. 2s. 6d., and there is nothing doing for forward. In the paraffin section there is a further firmness to note in lubricating oils, partly owing to reports of American makers having added another 10s. a ton to their prices. Scale, wax and candles are also pretty firm, and the interest of makers of these is at present on the acute stage over the meeting in London appointed for the 14th inst. of English, Scotch, and American delegates to settle the convention for another year. Mr. Bedford, of the Standard Oil Company, New York, is on his way across, and will be present on behalf of the American producers. Chief prices current are:—Soda crystals, 43s. 6d. net Tyne; alum in lump, £5. 0s. 0d., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 48/52°, 1½d. less 5% Tyne; caustic soda, white, 76°, £9. 70/72°, £7. 12s. 6d., 60/62°, £6. 15s., and 60/62° cream, £6. 7s. 6d., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5., and 1 cwt. casks, £5. 5s. net Tyne; refined alkali, 48/52°, 1½d., less 7½% Tyne; saltcake, 26s. to 28s.; bleaching powder, £5. 15s. to £6. 0s.; less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. 4½d. to 8s. 6d., sulphate of ammonia, £12. 2s. 6d. f.o.b. Leith; salammmoniac, 1st and 2nd white, £36. and £34., less 2½% any port; sulphate of copper; £23. 0s., less 5% Liverpool; paraffin scale, hard, 2½d., soft, 2d.; paraffin wax, 120°, semi-refined, 2½d.; paraffin spirit (naphtha), 10d.; paraffin oil (burning), 6¾d. to 7d., at Glasgow; ditto (lubricating), 865°, £5. to £5. 10s.; 885°, £5. 10s. to £6. 0s.; and 890/895°, £7. to £7. 10s. Week's imports of sugar at Greenock were 28,669 bags.

THE LIVERPOOL MINERAL MARKET.

Our market still continues to improve, and a further advance has taken place in most minerals. Manganese: Arrivals have continued small, and prices have further advanced. Magnesite: Raw lump, unchanged, raw ground, £6. 10s., and calcined ground, £10. to £11. Bauxite (Irish Hill Brand): is in very strong demand, bringing full

prices. Lump done at 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine; arrivals continue. French chalk: arrivals have been rather small this week, and prices continue strong, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate) steady; selected crystal lump scarce at £6; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6., and selected crystal ground, £8. Sulphate unchanged; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground, best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone is unchanged, ground at £10., and specially selected lump, finest quality, £13. Iron ore has still improved. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 14s. to 18s. Purple ore, 12s. 6d. Spanish manganiferous are fully sold, but orders are being taken for forward delivery at 27s. 6d. for 20 per cent. Emery-stone: best brands scarce, and bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls, £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal have somewhat improved. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore, best qualities scarce and demand; prices firmer. Antimony ore: Prices firmer. Antimony metal, £73. to £75. Uranium oxide 24s. to 26s. Asbestos: Best rock £17. to £18.; brown grades, £14. to £15. Potter's lead ore dearer; Small's £12. to £13.; selected lump, £14. to £15. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native) £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand, brings full prices; 50s. for ground English. Plumbago: More offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. French sand, in cargoes, scarce on spot—20s. to 22s. 6d. Ferromanganese selling at very much higher prices. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS remain unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

REPORT OF MANURE MATERIAL.

The new year opens with a good inquiry for all kinds of phosphatic material, but scarcity of supplies stands in the way of a large business. Nitrogenous material, other than nitrate of soda, is also inquired for, and anything offering is readily placed at a full price.

The value of Charleston River phosphate rock is nominally about 11d. per unit, c.f. and i., to U. K., but shippers are very shy about offering at all in quantity for shipment ahead, anticipating still higher prices later on. For 55/60% Somme, 10¾d., for 60/65%, 1s., and for 65/70%, 13½d., c.i.f. in bulk, in cargoes to U. K., would have to be paid, ½th rise in each case. We have no alteration to report in values, of Belgian, the higher qualities, for the most part, being withheld for the present. Neither have we any business in Canadian to report, the extreme prices demanded by shippers at present precluding business.

For bone ash, £5. 5s. on 70%, Hamburg terms, now asked, but £5. 3s. 9d. might possibly still be business, this being the price of last sale reported.

Sale of an October cargo of River Plate bones is reported at £5. 10s. to U. K., and the same price would be submitted for a December shipment. No further business reported in crushed India bones, but £5. 10s. would be paid for fine parcels near at hand, or £5. 7s. 6d. later shipment. £5. 12s. 6d. required for East Indian bone meal in any position, and sales have been made at this price to an outport.

Nitrate of soda continues very quiet at 8s. 4½d. per cwt. on spot. Nearest value of due cargoes is 8s. 4½d. to 8s. 6d., and November shipments, 8s. 7½d., but there is very little disposition to speculate at all in the face of the very heavy visible supplies.

Further sales of River Plate blood are reported to have been made at full prices, but exact figures do not transpire. Prices for ground horn and hoof and other similar nitrogenous material unchanged.

Superphosphates much inquired for, and 26 per cent. is now worth fully 47s. 6d. per ton, in bulk, f.o.r. at works, with every prospect of a further advance.

Since the turn of the year there seems to be a greater disposition on the part of manure manufacturers to complete their purchases, and we anticipate that a large business will be concluded within the next week or two.

TAR AND AMMONIA PRODUCTS.

The demand for tar products is fairly good all round. Benzols are firmer, and have advanced slightly in price, 90's being 3s. 6d., and 50/90's 2s. 8d. Solvent naphtha continues in very good request, and creosote has moved off well enough to keep producers low in stock. The demand for anthracene has been very good, and much has changed hands, though it does not seem that it has gone to the ultimate user. There are indications that speculators have absorbed most of that which has found its way into the market, and the times is coming when it will have to be re-sold. Selling second-hand anthracene is, however, not such an easy matter, so that the future of this article is a little bit uncertain. Pitch is slightly easier, though only a matter of 1s. or so, but at present values a considerable business has been done.

The sulphate of ammonia market is quiet, though it has preserved its steadiness so far as prices are concerned. Business has been reported from Hull at prices ranging from £12. 2s. 6d. to £12. 3s. 9d., and at Liverpool, £12. to £12. 2s. 6d. The price at Leith may be quoted at £12. 2s. 6d., though it is rumoured that £12. 1s. 3d. has been accepted. The Continental demand is hardly up to the mark at present, though there is no doubt it will presently improve. In the meanwhile there are no heavy stocks weighing on the market, and there is a fair home demand. The nitrate market is exceedingly dull, and large arrivals and heavy shipments have not tended to improve the position.

New Companies.

CAMBORNE GAS COMPANY, LIMITED.—This company was registered on the 12th ult., with a capital of £10,000, in £5. shares, to supply gas, electricity, or other illuminating agent, at Camborne, Cornwall. The subscribers are:—
 Shares
 F. W. Thomas, Camborne, accountant 1
 W. Bailey, Camborne, bank manager 1
 T. S. Lowry, Camborne, bank manager 1
 R. H. Williams, Camborne, secretary 1
 J. R. Daniell, Camborne, solicitor 1
 A. G. Richards, Camborne, clerk 1
 W. Pike, Camborne, mine purser 1

GEMMING AND MINING COMPANY OF CEYLON, LIMITED.—This company was registered on the 12th ult., with a capital of £100,000, in £2. shares, 50 being founders' shares, to acquire land in Ceylon and elsewhere, supposed to contain sapphires, cat's eyes, rubies, tourmalines, amethysts, topaz, star stones, and other precious stones and other minerals; and in particular the estate of Everton (Kabragallakelle) and Aberfoyle (Kalkanda), containing respectively about 760 and 520 acres, and also the mining and gemming rights over the Rangweltenne Estate of 404 acres, and the Springwood and Barro Estate of 1,100 acres, all situate in Ceylon. The subscribers are:—
 Ord.
 Shares.

Neil Morris, Wallwood-road, Leytonstone, clerk 1
 Lionel Walsh, Dancer-road, Fulham, clerk 1
 Gordon Hunter, 6, Handley-road, N.E., clerk 1
 F. Vernon Ball, 126, Whitehorse-road, Stepney, commission agent 1
 Charles Dixon, 57, Moorgate-street, accountant 1
 Wm. Bowman, 31, Gilmore-street, Lewisham, accountant 1
 A. Lightoller, 12, Argyle-square, W.C., clerk 1

MILWALL LEAD COMPANY, LIMITED.—This company was registered on the 12th ult., with a capital of £75,000, in £100. shares, to acquire all or part of the business of Pontifex and Wood, Limited, of Millwall and Shoe-lane, relating to lead, antimony, white lead, oils, and colours. The subscribers are:—
 Shares

A. E. Walker, 102, Lenham Gardens 1
 A. H. Lancaster, St. Peter's Chambers, Cornhill, lead merchant 1
 F. J. Walker, 7, Lougbridge-road, S.W. 1
 J. H. Enthoven, 17, Gracechurch-street, lead merchant 1
 J. Enthoven, 17, Gracechurch-street, lead merchant 1
 F. Enthoven, 17, Gracechurch-street, lead merchant 1
 A. L. Enthoven, 14, Connaught-place 1

NEW BALLESWIDEN SYNDICATE, LIMITED.—This company was registered on the 13th ult., with a capital of £15,000, in £1. shares, to acquire the lease of the New Ballewsinden Mine, parish of Saint Just, Cornwall. The subscribers are:—
 Shares

Commander The Hon. W. Grimston, R.N., St. Albans 1
 C. E. Holdsworth, Woodside-grange, Wimbledon, miner 1
 F. B. Henderson, C.E., 62, St. Clement's-house 1
 J. G. Dalzell, 12, Clement's-inn, solicitor 1
 E. Bennett, Harlesden 1
 E. Mackay, 27, Clement's-lane, clerk 1
 T. Clay, Suffolk House, E.C., engineer 1

PRECIOUS STONES AND MINERAL EXPLORATION SYNDICATE OF CEYLON, LIMITED.—This company was registered on the 12th ult., with a capital of £10,200, in £1. shares, 200 being deferred or founder's shares, to acquire mines and mining rights in Ceylon or elsewhere. The subscribers are:—

	Shares
N. T. Treveen, Gate House, Hampton Court	1
N. P. Miles Tronson, 8, Drapers' Gardens, financial agent	1
R. Atwood, 8, Drapers' Gardens, accountant	1
Lieut. Col. F. W. Wheeler, 18, Lawn-terrace, Blackheath	1
G. H. Homan, 16, Hartham-road, N., secretary to a company	1
J. Hodgkyns, 8, Drapers' Gardens	1
H. G. Revell Brade, 10, Herbert-crescent, Han's-place, S.W., journalist	1

CORONA HILL SILVER MINING COMPANY, LIMITED.—This company was registered on the 17th ult., with a capital of £150,000, in £1. shares, to acquire mineral and other property in New South Wales, and in any other of the Australian Colonies, or elsewhere. The subscribers are:—

	Shares
John Proffitt, 32, Great George-street, solicitor	1
A. O. Scott, 32, Great George-street, solicitor	1
J. McDonnell, 114, Christchurch-road, Tulse-hill, solicitor	1
H. Allan, 12, Delahay-street, S.W., chartered accountant	1
A. G. Weddell, Dorking, solicitor	1
H. T. Bird, 4, Great George-street, chartered accountant	1
F. C. Potter, 4, Great George-street, chartered accountant	1

GULF COAST MINING COMPANY, LIMITED.—This company was registered on the 16th ult., with a capital of £20,000, in £1. shares, to carry on mining operations (locality not stated). The subscribers are:—

	Shares
A. Charles, 14, Baalbec-road, Highbury, clerk	1
A. H. Foster, 65, Albany-road, St. John's, S.E., clerk	1
A. W. Langton, 67, Manor-road, Brockley, clerk	1
W. S. Gay, 249, Farrington-road-buildings, clerk	1
T. Hancock, 4, The Terrace, Barn-street, N., clerk	1
A. Hawkins, 15, Lander-terrace, Wood-green	1
A. G. Blackman, 72, Alscot-road, Bermondsey, clerk	1

KLIPFONTEIN MINING AND ESTATE COMPANY, LIMITED.—This company was registered on the 16th ult., with a capital of £70,000, in £1. shares, to carry on mining operations in Africa. An agreement will be entered into with Wolf Carlis, and Ferdinand Eugene Schuler. The subscribers are:—

	Shares
S. B. Garcia, 18, Henrietta-street, Covent Garden	1
C. Graham Bennett, 7, Wakefield-road, Tottenham	1
W. R. Mercer, 14, Anhalt-road, Battersea-park, clerk	1
W. Vize, 64, Craford-road, Tufnell-park, clerk	1
H. W. Moore, 29, Versailles-road, Anerley, clerk	1
T. J. Seel, 5, Cophall-buildings, accountant	1
W. H. Adams, 168, Friern-road, S.E.	1

NORTH AFRICAN GAS SYNDICATE, LIMITED.—This company was registered on the 13th inst., with a capital of £30,000, in £1. shares, to manufacture and supply gas or other luminant in Algeria and other parts of Northern Africa. The subscribers are:—

	Shares
T. M. McGeagh, 21, Bedford-place, engineer	1
R. Hutchinson, C.E., M.E., 2, Clyde-street, Kensington	1
W. McLachlan, M.E., College-hill-chambers, E.C.	1
J. G. Pigott, College-hill-chambers, E.C., accountant	1
H. M. Dunstan, 50, Avenue-road, West Kensington	1
H. Schallehn, 13, Stockwell-park-road	1
C. F. Bentley, 53, Gloucester-road, N., accountant	1

RUGBY AND NEWBOLD CEMENT COMPANY, LIMITED.—This company was registered on the 19th ult., with a capital of £12,000, in £5. shares, to acquire certain freehold property at Newbold, Warwick, and the goodwill of the business of manufacturers of lime and cement carried on there. The subscribers are:—

	Shares
Frank Creke, 8, Newhall-street, Birmingham, chartered accountant	1
J. Hopewell, Rugby, stationer	1
A. H. Singleton, Balsall Heath, Birmingham, clerk	1
D. Parkes, Wellington-street, Birmingham, clerk	1
D. Daly, Jun., Handsworth, Birmingham, clerk	1
J. Garrick, 92, Sloane-street, Chelsea, contractor	1
R. Brown, 19, Exeter-place, Chelsea, clerk	1

TRANSVAAL PETROLEUM, LIMITED.—This company was registered on the 21st ult., with a capital of £5,000, in £1. shares, 2,000 being founders' shares, to acquire concessions, oil wells, lands, estates, and properties in Burmah, India, Canada, Australia, New Zealand, Borneo, Beluchistan, South Africa, and elsewhere, and to develop the resources thereof; and to carry on business as oil prospectors, refiners, and merchants. The subscribers are:—

	Shares
T. W. Watson, Pailton, near Rugby	1
A. T. Angus, 15, Fielding-road, W., engineer	1
H. Haycroft, 4, Farnham Royal, Kennington, shorthand writer	1
C. E. Harvey, 110, Cannon-street, secretary to a company	1
W. G. Hampton, 77, King William-street, manager	1
E. E. Young, 12, Cranbourne-road, Stratford, clerk	1
A. S. Macnaughton, 31, Lombard-street, accountant	1

AUTOMATIC TAP SYNDICATE LIMITED.—This syndicate was registered on the 24th ult., with a capital of £2,000, in £10. shares, to acquire and work patent rights granted to James Rigg, Thomas Meacock, and Angus William Cuthbert Ward, for improvements in valves, taps, or cocks, for domestic, sanitary, and other uses. The subscribers are:—

	Shares
C. W. Duncan, 41, Linden-gardens, solicitor	5
Lucian de Rin, Ethelburga-house, ship-broker	5
W. H. C. Mahon, 33, Ely-place, solicitor	5
H. A. Jackson, Burgess-hill, Sussex	5
J. Howard Calls, Moorgate-street, builder	5
J. McMillan, 4, Finchchurch-avenue, shipbroker	2
G. Kemp Wild, 113, Cheapside, artists' colourman	3

ELECTRICAL STANDARDISING, TESTING AND TRAINING INSTITUTION, LIMITED.—This company was registered on the 31st ult., with a capital of £10,000, in £5. shares, to establish, maintain, and carry on any standardising, testing, or calibrating institution or institutions, where all or any electric measuring instruments can be tested, calibrated, or standardised. The subscribers are:—

	Shares
W. A. Pittman, 7, St. Helen's Gardens, North Kensington	1
J. Whitehead, Heycot, Crouch-end, electrical engineer	1
T. E. Towerson, F.C.S., 1, Portland-road, Finsbury-park, analytical chemist	1
H. Linklater, 117, Bishopsgate-street, accountant	1
R. Acock, 117, Bishopsgate-street, secretary	1
J. A. Roxburgh, 117, Bishopsgate-street, clerk	1
O. W. Seligman, 3, Moreton-gardens, South Kensington	1

ELLIS, DREW, AND COMPANY.—This company was registered on the 30th ult.,

with a capital of £10,000, in £5. shares, to are:—

K. Francis, Burgess-hill, Sussex, wine
J. W. Miles, Burgess-hill, Sussex, nurse
D. Parsons, St. John's-common, engineer
C. Holland, Burgess-hill, shop assistant
W. Pollington, 61, Queen's-road, Brighton
E. A. Gravett, Burgess-hill, potter
J. T. Martin, Buckingham-street, Strand
FOLKESTONE SANITARY STEAM LAUNDRY
was registered on the 27th ult., with a capital indicated in title. The subscribers are:—
T. G. Heron, Folkestone, grocer

H. W. Taylor, East Folkestone, laundry.
D. Baker, Folkestone, contractor

W. D. Fagg, Folkestone

H. Marchant, Folkestone, hotelkeeper

G. C. Conley, Cheriton, Sandgate, contra
H. H. Barton, Folkestone, auctioneer ...

GOLD KOPPE MINING COMPANY, LIMITED.
31st ult. with a capital of £333,007. in £1 sh.
rights in Austria and elsewhere and to adopt
between Andrew Wm. Gill and Arthur Wm. V

T. W. Rudderforth, 12 Prideaux-road, Cl
C. R. A. Proctor, 31, Lothian-road, North
W. D. Turner, Mowbray-road, Upper No
C. K. Greenwell, 28, Upper Hamilton-ter
C. W. Cuthbert, 3, Upper John-street, Kin
C. E. Green, 208, Ashmore-road, W., secre
J. Hobbs, 30, Union-street, Hackney-road,
HONDURAS CORPORATION, LIMITED.—This
ult., with a capital of £62,500, in £25. shares
duras, and to develop and turn the same to acc
ing, agricultural, trading, and other operations

J. N. McAdam, C.E., Surrey House, Vico
G. T. Jellicoe, 328, Mansion-house chamber
J. H. Hamilton, 21, Bedford-street, Strand, 1
F. L. Marshall, 83, Queen-street, secretary
H. C. Eaton, 42, Doughty-street, W.C. ...

T. Goddard, 11, Queen Victoria-street, finar
G. H. De Lasaux, 30, High-street, Canterbu
LEEDS AND WAKEFIELD BREWERIES, LIMIT
conversion to a company of the brewery business
J. Pilling Kirk, of Leeds, and of Messrs. H. M
of Wakefield. It was registered on the 31st ult.,
shares, 10,000 being six per cent. cumulative p
are:—

W. Barrett, Forest-road, E. accountant
E. R. Porter, 47, Lupton-road, N.W.

J. Clarke, 12, Gordon-road, Hornsey

H. J. Bass, 177, King's-road, N.W., factory
G. E. Friend, 8, Larcom-street, S.E., mercha
J. Kelly, 24w, Peabody-square, Jomes-street,
W. Glynn, 14, Little Albany-street, N.W., cle
PEAT UTILISATION COMPANY, LIMITED.—Th
24th ult., with a capital of £200,000, in £5. shar
George Henry Berand, for the treatment and uti
transformation into peat wool and its application fu
are:—

Frederick Wm. Bird, Chiswick

E. H. Cannon, Temple, barrister

Cyril Leslie Johnson, Ealing

F. Ernest Bird, 26, Budge-row, solicitor

H. Richards, Courtenay-road, Penge, accountant
G. Benezet, 32, Regent-square

C. T. Plant, 30, Harewood-square

SANITATION COMPANY, LIMITED.—This company
with a capital of £10,000, in £5. shares, 300 of which
on business as sanitary engineers. The subscribers a
R. J. Arbon, 14, Victoria-street

G. Gill, Warwick-lane, publisher

W. E. Garstin, 24, Marlbro'-road, N.W.

S. Call, 85, Baker-street, W., Accountant ...

A. Garstin, Ivy Walls, Barnes-common

H. C. Burt, 42A, Bowe-lane, silk agent

W. C. Watts, 110, Upland-road, Dulwich, clerk
SEPOY COMPANY, LIMITED.—This company was re
a capital of £1,000, in £5. shares, to acquire the busin
facturers, carried on by J. Hudspeth Pearsons of Pe
Sepoy Rubbing oils, Indian Balm and Morning Liver
Long Causeway, Peterborough.

SKELSEY'S ADAMANT CEMENT COMPANY, LIM
registered on the 1st inst., with a capital of £50,000,
the business of cement manufacturer, carried on by C
subscribers are:—
G. H. Skelsey, Hull

R. Brearby, Batley, cloth manufacturer

A. Brearby, Batley, cloth manufacturer

W. Skelsey, Batley, cloth manufacturer

the smelting of iron ores, and the manufacture and sale of iron goods of all kinds. To explore, work, and develop mines. The subscribers are:—
 Tom Donald, 50, Antill-road, Bow, clerk Shares.
 W. Gordon Hughes, 18, Winchester-road, Belsire-park, clerk
 C. P. Beale, 33, Wakehurst-road, Wandsworth-common, clerk
 J. Eustace, 72, St. Donat's-road, accountant, Newcross
 T. Brown, 85, Hornsey-park-road, accountant
 J. W. Noian, 21, De Laune-street, Kennington-park, clerk
 T. Hodge, 2, Park-villas, Albion-road, N. clerk
HIGGOTT'S DRUG STORES, LIMITED.—This company was registered on the 3rd inst., with a capital of £800, in £1. shares, to acquire the business of H. Higgott, of 23, Market-place, Great Bridge, Stafford, chemist. The subscribers are:—
 Shares.

Eliza Higgott, Stapenhill, Burton-on-Trent
 H. Higgott, Great Bridge, chemist
 Sarah Jane Higgott, Stapenhill
 John Higgott, Burton-on-Trent, clerk
 W. Higgott, Burton-on-Trent, farmer
 S. Higgott, Burton-on-Trent
 Mrs. Jane Higgott, Burton-on-Trent
HONITON GAS AND COKE, LIMITED.—This is the application of limited liability to this company, which was originally constituted by Deed of Settlement on the 20th November, 1834. It was registered on the 4th inst., with a capital of £4,900, in £10. shares, the whole of which are taken up, and are fully paid.
MIDLAND COAL, COKE, AND IRON COMPANY, LIMITED.—This company was registered on the 3rd inst., with a capital of £375,000, in £10. shares, to acquire collieries and other mines, ironstone works, blast furnaces, brickworks, coke ovens, &c., in the parishes of Audley and Wolstanton, County of Stafford, known as Potmore Hall, Haywood, Apedale and Chesterton. The subscribers are:—
 Shares.

J. T. Smith, Stratford-on-Avon: bank director
 J. H. E. Heathcote, M.P., Apedale Hall, Newcastle-under-Lyne
 B. Gibbons, 70, St. Bridgegate-street, Manchester, merchant
 J. E. Huxtable, Holland-park-gardens, W., solicitor
 W. F. Pollock, 12, Cumberland-terrace, Regent's-park
 W. B. Blyth, Rockbourne-road, Forest-hill
 Shares.

Gazette Notices.

PARTNERSHIPS DISSOLVED.

CHESTER AND GIBB, Bucklersbury, London, and JOHANNESBURG AND BARBERTON, South Africa, consulting mining engineers and sole agents for vending mining and other machinery manufactured by Fraser and Chalmers, of Chicago, and by the Sprague Electric Railway and Motor Co., New York.
J. HARTLEY AND J. SPENCE, under the style of Paton and Charles, Wapping, soap manufacturers.
B. AND H. WADDINGTON, Bradford, chemists, druggists, and dentists,
J. C. PAIN AND SONS, Walworth-road, London, and Mitcham, and elsewhere, pyrotechnists, as far as regards J. C. Pain.
E. BROWNLOW AND F. W. BROWNLOW, under the style of Slack and Brownlow, Manchester, filter manufacturers.
RAWLINS AND WILSON, Trencham, brick and tile manufacturers.
R. H. MONRO, SIR F. G. MILNER, THE HON. R. PARKER, THE HON. G. N. DAWNEY, and THE HON. C. T. DUNDAS, under the style of the Tadcaster Tower Brewery Co., York and Tadcaster, brewers and maltsters, and wine and spirit merchants, as far as regards R. H. Monro.
W. G. HARRISON AND W. WALKER, Junr., under the style of W. G. Harrison and Co., Liverpool, manufacturing chemists.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

WM. WILLIAMS (trading as Williams and Co.), Ramsgate, brewer and mineral water manufacturer.

First Meetings, and Public Examinations.

THOS. HART, Heaton Norris, pharmaceutical chemist, January 10, Official Receiver's Office, Stockport, January 15, Court House, Stockport.
CHAS. POULTON, Ipswich, mineral water manufacturer, January 10, Official Receiver's Office, Ipswich, January 16, Shire Hall, Ipswich.

Adjudications.

CHAS. POULTON, Ipswich, mineral water manufacturer.

Notices of Dividends.

HERBERT REES TREHARNE, Gt. Chapel-street, Soho, London, also Wharf, Lombard-road, Battersea, London, late of Lavender Gardens, Hill, London, stone, lime and cement merchant, first div. of 7s. 6d. any day.
Official Receiver's Office, 33, Carey-street, Lincoln's Inn, London.
JOHN ANTHONY ENRIGHT (trading as J. A. Enright & Co.), Llanerchymyn, mineral water manufacturer, first and final dividend of 1s. 8½d., January Brynallaw, Menai Bridge, Anglesey.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Method of Dividing Glass Cylinders. J. G. Sowerby. 20,619, Dec. 23.
Sprinklers for the Automatic Extinction of Fires. W. Whitehead. 20,622, December 23.
Apparatus for Raising Liquids. W. P. Theermann. 20,624, December 23.
Rendering Textile and other Fabrics fire proof. W. S. Somers. 20,625, December 23.
Electric Distribution. W. M. Mordey. 20,627, December 23.
Collecting for Further Utilisation the Excess of Carbonic Acid Generated During the Manufacture of Beer. L. Haas. 20,630, December 23.
Heel-ball Composition for Boots. H. W. Farrer and E. Young. 20,637, December 23.
Sensitising and Developing Chloride of Silver for Photographic Purposes. W. H. Caldwell. 20,662, December 23.
Apparatus for Grinding and Amalgamating Ore Containing Gold and Silver. M. Crawford. 20,663, December 23.
Treatment of Textile Fabrics by means of Ammoniacal Oxide of Copper to Increase the Waterproof and Non-Combustible Character of the Fabrics (complete specification). C. Baswitz. 20,665, December 23.
Manufacture of Colouring Matters Suitable for Dyeing. J. Y. Johnson. 20,668, December 23.
Anti-Friction Bearings. H. W. Libbey. 20,670, December 23.
Apparatus for Treating Finely-divided Metalliferous Material for the Purposes of Separation and Amalgamation. W. L. Wise. 20,677, December 23.
Production of Compounds of the Diphenylmethane Group and the Rosaniline Series. O. Imray. 20,678, December 23.
Smokeless and Gasless Fuel. A. Myall. 20,679, December 23.
Materials for Covering Roofs. A. Myall. 20,680, December 23.
Tanks for Melting or Founding Glass. S. Washington. 20,687, Dec. 24.
Drying and Heating Chambers. J. H. R. Dinmore. 20,705, Dec. 24.
Dyeing and Scouring Machines—(Complete Specification). J. P. Delahunt. 20,715, December 24.
Boiling and Precipitating Tower—(Complete Specification). G. E. Pennycook. 20,720, December 24.
Obtaining Ammonia from Atmospheric Nitrogen and the Hydrogen of Decomposed Steam. J. C. Fell. 20,722, Dec. 24.
Apparatus for Drying Minerals. R. Morris and J. Wood. 20,730, Dec. 24.
Magneto-electric Machines—(Complete Specification). R. Haddan. 20,734, December 24.
Bunsen Burners. G. Reimann. 20,744, December 24.
Electrical Accumulators. F. Marx. 20,751, December 24.
Manufacture of Electrodes for Electric Batteries. F. Marx. 20,752, December 24.
Process for Determining the Amount of Water Contained in Steam. M. Gehre. 20,755, December 24.
Process of Producing Mixed Coloured Silk for Obtaining Mixed Coloured Silk Fibre. R. J. MacLean. 20,771, December 27.
Apparatus for Measuring the Flow of Liquids. H. Sutcliffe. 20,775, December 27.
Apparatus for Evaporating Liquids. R. A. Robertson and W. J. Mirrieles. 20,784, December 27.
Treatment of Spent Acid. J. Longshaw. December 27.
Ventilating Waterproof Garments. G. C. Mandelberg, H. L. Rothband, and S. L. Mandelberg. 20,804, December 27.
Refrigerating Apparatus. T. B. Hill and J. Sinclair. 20,811, Dec. 27.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Dec. 21st.

Alkali—

Holland, 200 c. H. Wallace & Co.
 France, 135 Arnati & Harrison
 Holland, 100 Beresford & Co.
 " 900 W. G. Taylor & Co.
Acetate of Soda—
 France, £85. W. G. Blagden
 " 100 Lister & Biggs
 " 23 Barr, Mooring & Co.
 " 75 Hunter, Waters, & Co.

Acetic Acid—

Holland, 15 pkgs. A. & M. Zimmermann

Antimony Ore—

France, 20 t. Pillow, Jones, & Co.
 Portugal, 77 H. Emanuel

Alum—

Holland, £50. Ohlenschlager Bros.

Bones—

Holland, 13 t. J. Gibb & Co.
 Egypt, 25 M. D. Co.

Barium Chloride—

Germany, £80. Petri Bros.

Barytes—

Germany, 22 cks. O. Hara & Hoar
 " 22 W. Harrison & Co.
 " 22 O. Hara & Hoar
 Belgium, 22 W. Harrison & Co.
 Holland, 40 Burrell & Co.
 " 45 D. Storer & Sons
 " 41 Prop. Scott's Whf.
 Germany, 19 W. G. Taylor & Co.

Brimstone—

Italy, 5 t. G. Boor & Co.
 " 115 Johnson & Hooper
 " 15 W. C. Bacon & Co.
 " 500 Seager, White, & Co.

Boracic Acid—

Italy, 24 pkgs. Howards & Son

Borax—

Italy, £277. A. Faber & Co.

Chemicals (otherwise undescribed)

Germany, £5. Philipps & Graves
 " 743 A. & M. Zimmermann
 Holland, 14 R. Morrison & Co.
 " 10 Philipps & Graves
 Germany, 90 T. Farmer & Co.
 Belgium, 10 T. H. Lee
 France, 620 A. Henry & Co.
 Germany, 141 T. H. Lee
 " 5 Grosscurth & Luboldt

Caoutchouc—

Natal, 12 c. H. Rooke, Sons, & Co.
 Pt. Louis, 4 Arbuthnot, Latham, & Co.
 E. Indies, 112 Wallace Bros.
 " 20 L. & I. D. Jt. Co.

France, 560 W. Balchin
 W. Africa, 17 Matheson & Co.
 Mauritius, 6 Blyth, Green, & Co.
 E. Indies, 20 L. & I. D. Jt. Co.
 Holland, 1 Norris & Joyner
 Pt. Louis, 5 L. & I. D. Jt. Co.
 U. States, 5 Williams, Torrey, & Co.
 E. Indies, 53 Henderson Bros.

Copper Ore—

Norway 10 c. W. E. Bott & Co.

Green Tartar—

Holland, 8 pkgs. W. C. Bacon & Co.
 Italy, 28 B. Jacob & Son
 France, 5 C. F. Gerhardt
 " 5 Webb, Warter, & Co.
 Holland, 50 A. & M. Zimmermann
 Italy, 9 W. C. Bacon & Co.
 Holland, 6 Middleton & Co.

Copperas—

Germany, £35 Burgoyne, Burbidge, & Co.

Gamphor—
Germany, 2 pkgs. L. & I. D. Jt. Co.

Dyestuffs—

Extracts
Germany, 1 pkg. H. Johnson & Sons
France, 31 T. H. Lee

Germany, 150 L. J. Levinstein & Sons
Germany, 20 Hermann, Keller, & Co.

U. States, 2 L. & I. D. Jt. Co.
Holland, 40 W. Burton & Sons

Germany, 40 Burt, Boulton, & Co.
Austria, 600 T. H. Lee

Oreochalla
E. Indies, 38 pkgs. Beresford & Co.

Ceylon, 42 Kebbel, Son, & Co.
Natal, 16 L. & I. D. Jt. Co.

Natal, 200 H. Rooke, Sons, & Co.
Ceylon, 16 Lambert & Strong

Gambler
E. Indies, 403 pkgs. R. & J. Henderson

Germany, 403 Brinkmann & Co.
Argentina, 89

Argols
Cape, 15 pkgs. Brown & Elmslie

Annatto
Ceylon, 50 pkgs. Hoare, Wilson, & Co.

France, 5 Fullwood & Bland
Ceylon, 10 J. W. Cater, Sons & Co.

Cochineal
Canaries, 80 pkgs. W. M. Smith & Sons

Germany, 10 Swanson & Co.
Germany, 10 Johnson, Rolls, & Co.

Germany, 12 H. R. Toby & Co.
Germany, 20 Kuhner, Hendschel, & Co.

Nyaboluma
E. Indies, 366 pkgs. J. Graves

Germany, 1818 Beresford & Co.
Germany, 1000 Marshall & French

Germany, 1366 L. & I. D. Jt. Co.
Dyestuffs (otherwise undistributed)

E. Indies, 750 bgs. Ralli Bros.
Sweden, 2 cs. M. D. Co.

Indigo
E. Indies, 18 chs. W. Brandt, Sons, & Co.

Germany, 6 Caldwell, Watson, & Co.
Germany, 6 L. & I. D. Jt. Co.

Germany, 12
Germany, 10
Natal, 16 Arbuthnot, Latham, & Co.

Natal, 16 Parsons & Keith
E. Indies, 7 Benecke, Souchay, & Co.

Greytown, 35 sons A. Jimenez & Sons
Germany, 7 Lewis & Peat

Saffron
Spain, 1 pkg. C. Brumlen

Germany, 1 Major & Field
Germany, 1 Pickford & Co.

Gumac
Italy, 400 pkgs. J. Kitchin

Germany, 100 W. France
Germany, 100 Oakley

Germany, 100 Beresford & Co.
Germany, 100 J. Knill & Co.

Tanners' Bark
Natal, 7 t. W. Dunn & Co.

Glycerine
Germany, 186 Becker & Ulrich

Germany, 140 H. Lambert
Germany, 100 Craven & Co.

Germany, 100 Prop. Scott's Whf.
Germany, 35 Beresford & Co.

Germany, 15 R. W. Greef & Co.
Holland, 68 Knight & Morris

Germany, 380 Spies Bros. & Co.
Germany, 150 F. W. Heilgers & Co.

Germany, 320 T. H. Lee
Gutta Percha—

Germany, 30 c. Kaltenbach & Schmitz
Holland, 22 Kleinwort, Sons, & Co.

E. Indies, 870 H. W. Jewesbury & Co.
Glucose—

Germany, 100 pkgs. 100 c. J. Barber & Co.

Germany, 77 616 M. D. Co.
Germany, 113 204 Barrett, Tagant & Co.

Germany, 21 185 C. Tennant, Sons, & Co.
Germany, 285 300 H.A. Litchfield & Co.

U. States, 500 500 Olyett & Francis
Germany, 300 300 J. F. Ohlmann

Germany, 300 300 J. Barber & Co.
Germany, 200 200 Anderson, Weber, & Smith

Germany, 200 200 Home & Co.
Germany, 25 200 Props. Scott's Whf.

France, 15 123 J. Cooper
France, 100 100 Barrett, Tagant, & Co.

Germany, 100 200 J. Forsey
Germany, 25 210 Fellows, Norton, & Co.

Germany, 100 100 Trier, Meyer, & Co.
Germany, 25 209 Anderson, Weber, & Smith

Germany, 25 175 W. Bush & Co.
Germany, 100 200 J. Forsey

Germany, 3 26 L. & I. D. Jt. Co.
Germany, 500 500 J. F. Ohlmann

U. States, 200 200 J. Cooper
U. States, 240 240 L. Sutro & Co.

Germany, 200 400 J. Forsey
Germany, 25 400 L. Sutro & Co.

Germany, 60 498 Anderson, Weber, & Smith

Germany, 100 955 Seaward Bros.
Germany, 200 200 Howell & Co.

Germany, 60 480 T. M. Duche
Germany, 100 100 M. D. Co.

Germany, 100 100 Barrett, Tagant, & Co.
Isinglass—

E. Indies, 7 pkgs. L. & I. D. Jt. Co.
Insect Powder—

U. States, 28 c. Davies, Turner, & Co.
Manure—

Phosphate Rock
France, 120 t. T. Farmer & Co.

Germany, 236 Moeller, Graetz, & Co.
Manure (otherwise undistributed)

Germany, 2 cs. Craven & Co.
France, 5 t. J. Burnett & Sons

Germany, 20 F. W. Berk & Co.
Naphtha—

Germany, 18 bris. Stein Bros.
Holland, 8 Domeier & Co.

Plumbago
Holland, 42 cks. Brown & Elmslie

Belgium, 9 W. Brandt, Sons, & Co.
Ceylon, 43 Hoare, Wilson, & Co.

Germany, 18 Fellows & Co.
Germany, 20 Pokorney, Fielder, & Co.

Ceylon, 20 W. W. Lupton
Germany, 437 Prop. Chamb. Whf.

Germany, 20 cs. O. Scholzig
Germany, 3 Beresford & Co.

Potassium Sulphate—
Germany, 17 pkgs. Ross & Deering

Pyrites
La Laja, 700 t. G. Ward & Sons

Germany, 500 Forbes, Abbott, & Co.
Paraffin Wax—

U. States, 225 bris. H. Hill & Sons
Germany, 358 J. H. Usmar & Co.

Potassium Muriate—
Germany, 529 pkgs. Bessler, Walchert, & Co.

Saltpetre—
Germany, 120 bris. P. Hecker & Co.

Holland, 135 G. Meyer & Co.
Germany, 4 cks. Craven & Co.

Germany, 35 P. Hecker & Co.
E. Indies, 594 bgs. Ralli Bros.

Germany, 16 cks. P. Hecker & Co.
Germany, 100 T. Merry & Son

E. Indies, 209 L. & I. D. Jt. Co.
Stearine—

Holland, 50 bgs. H. Hill & Sons
France, 90 sks. J. Goddard & Co.

Germany, 293
Belgium, 9 cks. H. Hill & Sons

Tartars
Italy, 36 pkgs. Nowards & Son

France, 22 Thames Steam Tug Co.
Italy, 7

Germany, 24
Germany, 22 Fellows, Norton, & Co.

Tartaric Acid—
France, 4 pkgs. Webb, Warter, & Co.

Holland, 10
Germany, 12 N. Smith

Ultramarine—
Germany, 4 cks. G. Steinhoff

Belgium, 5 pkgs. Ohlenslager Bros.
Germany, 2 W. Harrison & Co.

Holland, 3 cks. Leach & Co.
Belgium, 2 G. Steinhoff

Germany, 5 cs.
Zinc Oxide—

Holland, 334 cks. M. Ashby
LIVERPOOL.

Week ending Dec. 25th.
Albumen—

Marseilles, 10 cs.
Ammonia—

Bordeaux, 1 cs.
Borax—

Leghorn, 100 cs. 169 cks.

Brimstone—
Catania, 150

Germany, 50
Barytes—

Rotterdam, 23 cks.
Antwerp, 20 bgs.

Boracic Acid—
Leghorn, 40 cks.

Bone Meal—
Calcutta, 667 bgs.

Germany, 2,000
Bones—

Karachi, 4,002 bgs. Ralli Bros.
Boston, 4 cs.

Copperas—
Hamburg, 31 bris.

Chemicals (otherwise undistributed)
Boston, 36 bgs. J. Cassels & Co.

New York, 5 cs. Robinson & Allen
Carbon—

New York, 10 bxs. T. H. Boyce & Co.
Caoutchouc—

Pernambuco, 6 bls.
Ceara, 117 Bieher & Co.

Bageida, 6 pns. 31 bris. F. & A. Swanzy
Quittah, 3 15 J. H. Rayner & Co.

Germany, 2
Accra, 5 F. & A. Swanzy

Germany, 11 cs. C. Lane & Co.
Germany, 28 cks. 12 J. P. Werner

Germany, 14 51 J. J. Fischer & Co.
Salt Pond, 3 1 A. Millerson & Co.

Cape Coast, 23 1 L. Hart & Co.
Germany, 37 1 Fletcher & Co.

Germany, 1 C. L. Clare & Co.
Germany, 1 S. E. Nordlinger

Germany, 3 Havard & Co.
Germany, 3 Whimsted & Watson

Germany, 1 Grimwade, Ridley & Co.
Germany, 2 Ihlers & Bell

Germany, 8
Attaeboc, 2 bgs. Radcliffe & Durant

Germany, 1 Pickering & Berthoud
Grand Bassam, 15 cks. F. & A. Swanzy

Germany, 3 bgs. Edwards Bros.
Germany, 2 Pickering & Berthoud

Germany, 1 W. D. Woodin
Germany, 1 J. Sladellmann

Germany, 6 cks. A. Verdier
Sierra Leone, 3 14 bris. Pickering & Berthoud

Germany, 7 3 pns.
Isles de Los, 266 N. Waterhouse & Son

Germany, 266 F. Colin & Co.
Caustic Potash—

Dunkirk, 9 dms.
Copper Ore—

Leghorn, 126 t.
Galveston, 3,480 sks.

Copper Precipitate—
Huelva, 6,947 bgs. Matheson & Co.

Germany, 3,069
Dyestuffs—

Valonia
Constantinople, 133 bgs.

Smyrna, 196 t. Barry Bros.
Syra, 268 bgs. C. G. Nicolaidi

Germany, 34 C. Nicolaidis
Germany, 277 bis.

Divi Divi—
Curacao, 225 bgs. D. Midgley & Sons

Germany, 139
Rio Hache, 135 t. E. Brownbill & Co.

Dextrine
Bremen, 160 bgs.

Gumac
Palermo, 200 bgs. J. Kitchin & Co.

Germany, 260 bis. 675 bgs.
Germany, 150

Venice, 500 bgs.
Argols

Bordeaux, 50 bgs. 1 ck.
Extracts

Antwerp, 1 ck. J. T. Fletcher & Co.
Cochineal

Grand Canary, 40 bgs. Beach & Co.
Germany, 40 Lathbury & Co.

Teneriffe, 50 Intnl. Bank of London
Glu

H.

Gly

R.

Hot

Br.

Al.

M.

Iod

Va.

Lith

Ro.

Pyz

Hu.

Pots

Ha.

Pots

Ha.

Phos

Dur.

Pota

Har.

Pitch

Ams.

Sodli

Iqui.

Rott

Saltp

Har.

Calc

Sulph

Catani.

Stearin

Antwe.

Tartar

Naples.

Tartar

Messin.

Tartar

Rotterd.

Verdigi

Bordea.

Utrame

Rotterd.

Waste

Hambur.

Zinc Ox

Antwerp.

Week

Alkali—

Bremen.

Albumen

Riga.

Barytes

Bremen.

Chemica

Stettin.

Danzig.

Antwerp.

Hamburg.

Genoa.

Marseille.

Dyestuff

Sumac.

Trieste.

Palermo.

Alizar.

Rotterda.

Dextrin

Hamburg.

Dyestuff

Hamburg.

Glucose

New Yor.

Hamburg.

Stettin

Hamburg.

Glycerin

Venice.

Hamburg.

Horn Ph

Hamburg.

Manure
Hamburg, 17 cks. Wilson, Sons, & Co.
Pitch—
Bordeaux, 24 cks.
Antwerp, 9
Amsterdam, 14
H. P. Pudsey
Sugar of Lead—
Hamburg, 21 cks. Wilson, Sons, & Co.
Verdigris—
Bordeaux, 2 cks. Rawson & Robinson

GLASGOW.

Week ending December 26th.

Alum—
Hamburg, 117 cks.
Rotterdam, 13
Bone Meal—
Bombay, 4,104 bgs.
Barytes—
Rotterdam, 20 cks. J. Rankine & Son
Chemicals (otherwise undescribed)
Hamburg, 1 cs.
Rotterdam, 2
Cream Tartar—
Marseilles, 10 cks.
Chlorate of Manganese—
Rotterdam, 1 ck. J. Rankine & Son
Dyestuffs—
Tannin
Hamburg, 1 ck.

Madder
Rotterdam, 5 cks.
Bordeaux, 10
Rotterdam, 1
Alizarine
Rotterdam, 120 cks. J. Rankine & Son
220
Cutch
Halifax, 50 bks.
Glucose—
Hamburg, 42 cks.
Phosphate Rock—
Antwerp, 500 bgs.
Potassium Prussiate—
Hamburg, 2 cks.
Potash—
Hamburg, 20 cks.
Sulphur Ore—
Drontheim, 150 t.
Sugar of Lead—
Hamburg, 20 cks.
Saltpetre—
Rotterdam, 7 cks.
Hamburg, 23 J. Poynter & Son
Stearine—
Bordeaux, 50 bgs.
Tar—
Marseilles, 63 brls.
Tartar—
Bordeaux, 2 cks.
2 J. & P. Hutchinson
Tartaric Acid—
Marseilles, 43 brls.

Ultramarine—
Rotterdam, 4 cks. 3 cs.
Zinc Oxide—
Rotterdam, 50 cks.

TYNE.

Week ending December 12th.

Alum Earth—
Hamburg, 18 cks. Tyne S. S. Co.
Copper Precipitate—
Huelva, 5,552 bgs. A. Guthrie
Glucose—
Hamburg, 15 cks. Tyne S. S. Co.
Rotterdam, 100 bgs.
Nitre Saltcake—
Hamburg, 131 t.
Saltpetre—
Hamburg, 14 cks.
Sulphur Ore—
Huelva, 202 t. A. Guthrie

GOOLE.

Week ending Dec. 18th.

Alkali—
Ghent, 6 cbys.
Dyestuffs—
Alizarine
Rotterdam, 29 cks.
24
Madder
Rotterdam, 4 cks.

Dyestuffs (otherwise undescribed)
Boulogne, 72 cks.
2 cs.

Glucose—
Hamburg, 25 cks.
200 bgs.
Calais, 100
Potash—
Calais, 81 dms.
13 cks.

Saltpetre—
Rotterdam, 85 bgs.
Tartar—
Rotterdam, 5 cks.
Waste Salt—
Hamburg, 200 cks.
Hamburg, 508 bgs.
Waste Alum—
Rotterdam, 8 cks.

GRIMSBY.

Week ending December 21st.

Albumen—
Hamburg, 4 pkgs.
Chemicals (otherwise undescribed)
Hamburg, 5 pkgs.
Dyestuffs (otherwise undescribed)
Antwerp, 5 pkgs.
Glucose—
Hamburg, 25 cks.
90 bgs.
20
Zinc Ashes—
Antwerp, 26 cks.

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending December 21st.

Ammonia Carbonate—
Adelaide, 5 c. £11
Arsenic—
Yokohama, 1 t. 10 c. £21
Napier, 2 27
Alum—
Salonica, 20 t. 2 c. £110
Acids (otherwise undescribed)
Sydney, 12 cs. £31
Ammonia Sulphate—
Berber, 20 t. £250
Martinique, 10 17 c. 390
Cologne, 15 422
Hamburg, 24 9 315
Valencia, 90 6,000
Acetic Acid—
Auckland, 8 cks. £35
Ammonia Liquid—
H. Ayres, 20 cs. £46
Boric Acid
Melbourne, 1 t. 2 c. £44
Benzole Acid—
Philadelphia, 1 q. £10
Bone Meal—
Martinique, 144 t. 16 c. £470
Borax—
Melbourne, 17 c. £40
Keppel Bay, 20 cs. 81
Brimstone—
M. Video, 1 t. 4 c. £17
Copper Sulphate
Adelaide, 1 t. £111
Odessa, 6 t. 10 113
H. Ayres, 5 t. 11 110
Canton, 1 t. 12
Hilbao, 10 t. 10 112
Dunedin, 1 t. 12
Cream Tartar
Adelaide, 2 t. £121
Sydney, 2 t. 50
Melbourne, 1 t. 47
Caustic Soda
Adelaide, 1 t. 11 115
H. Ayres, 1 t. 10 114
Galle, 1 t. 10 113

Citric Acid—
Barcelona, 2 cks. £75
Hamburg, 5 c. 17
Amsterdam, 2 kegs. 15
Revel, 1 t. 137
Genoa, 1 t. 15 c. 235
Trieste, 5 40
Chemicals (otherwise undescribed)
Auckland, 40 cs. £30
Caliz, 8 pkgs. 48
Sydney, 4 t. 12 c. 103
Disinfectants—
Melbourne, 20 cs. £40
Guano—
Jersey, 85 t. £800
Manure—
Singapore, 30 t. 7 c. £240
Puerto Angel, 10 87
Rotterdam, 10 375
Boston, 2 cs. 11
Copenhagen, 160 t. 710
Alicante, 110 16 c. 836
Penang, 675 5,400
St. Lucia, 100 996
Bordeaux, 40 4 190
Bardadoes, 75 750
Demerara, 81 9 927
Oxalic Acid—
Venice, 26 t. £1,030
Paris, 5 175
Melbourne, 12 c. 25
Potassium Chlorate—
Lisbon, 10 c. £41
Phosphorus—
Las Palmas, 2 c. £21
Dunedin, 2,000 lbs. 215
Otago, 50 50
Phosphoric Acid Solid—
Demerara, 20 t. 3 c. £122
Saltpetre—
Adelaide, 1 t. 15 c. £31
Sulphuric Acid—
Hamburg, 9 c. £9
London, 10 4
Alton Bay, 5 15
Alton, 10 cs. 15
Noid, 1 t. 19 c. 9
Sheep Dip
Noid, 1 t. 19 c. £283
Canton, 100 dms. 118
Pungwa, 100 cs. 400
Alton Bay, 20 503
Galle, 50 100
Sodium Silicate—
Auckland, 4 t. 18 c. £17

Salicylic Acid—
Brisbane, 1 c. £30
Sodium Sulphate—
Ghent, 93 t. £90
Tartaric Acid—
Adelaide, 1 t. £131
Kurrachee, 10 c. 69
Sydney, 58 kgs. 300
Gibraltar, 2 c. 18

LIVERPOOL.

Week ending Dec. 21st.

Alkali—
Liverpool, 68 tcs. £240
Ammonia Carbonate—
Hamburg, 6 c. 1 q. £8
New York, 14 t. 10 1 470
Alum—
Alexandria, 6 t. £31
Beyrout, 8 1 c. 41
Smyrna, 19 8 1 q. 99
Volo, 1 9 2 8
Callao, 12 2 10
Kurrachee, 31 7 368
Buenos Ayres, 3 t. 15
Ammonia Sulphate—
Bordeaux, 59 t. £723
Hamburg, 20 7 c. 1 q. 244
Valencia, 10 17 2 2 410
Rotterdam, 52 3 3 626
Ammonia Muriate—
Boston, 3 t. 15 c. £95
Philadelphia, 6 3 127
Acetate of Lime—
Odessa, 15 t. 9 c. 1 q. £165
Bleaching Powder—
Baltimore, 113 cks. 5 cs. £32
Boston, 385 192 tcs. 41
Bilbao, 41 kgs. 41
Boston, 89
Calcutta, 92
Genoa, 34
Montreal, 4 35 brls.
Nantes, 104
New York, 107
New Orleans, 5 78
Philadelphia, 322 brls. 6
Borax—
Amsterdam, 15 c. 3 q. £8
Rouen, 10 t. 14 301
Halifax, 9 14

Borax Salts—
Havana, 2 t. 7 c. 2 q. £76
Brimstone—
Calcutta, 20 t. 12 c. 2 q. £98
Caustic Soda—
Antwerp, 8 bxs. 20 dms.
Astoria, 200 90
Barcelona, 200 90
Carthage, 5
Constantinople, 10
Fiume, 45
Genoa, 80
Ghent, 12
Havana, 50
Honolulu, 10
Kobe, 50 cks. 6
La Guayra, 150
Lisbon, 100
Leghorn, 100 57
Madrid, 4
Mauritius, 60
Messina, 200
New Orleans, 850
New York, 35
Norfolk, 15
Oporto, 25
Pasages, 30
Pernambuco, 75
Portland O., 31
Puerto Cabello, 15
Rouen, 18
Terneuzen, 40
Talcabano, 32
Trieste, 14
Valencia, 20 brls. 30
Valparaiso, 30
Yokohama, 300
Copper Sulphate—
Genoa, 5 t. 2 q. £90
Venice, 4 17 c. 88
Barcelona, 23 18 2 493
St. Nazaire, 5 1 2 180
Hilbao, 66 1 1,213
Bordeaux, 10 180
Rouen, 20 7 441
Tarragona, 6 127
Alexandria, 67 t. 9 c. £1,297
Antwerp, 5 3 2 q. 93
Leghorn, 1 1 3 21
Marseilles, 11 14 2 250
Bilbao, 10 6 1 185
Genoa, 63 6 2 1,171
Nantes, 60 3 3 1,320
San Sebastian, 10 4 185
Trieste, 1 1 1 24

Carbolic Acid—

Genoa,	14 c.	61
New York,	5 t. 8 3 q.	369
Rouen,	2	185

Copperas—

Malaga,	6 c.	£14
Melbourne,	11 t.	20
Syra,	7 18	14
Smyrna,	9 8	20

Charcoal—

Rouen,	50 t.	£223
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Citric Acid—

Vera Cruz,	5 c.	£37
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Caustic Potash—

Calcutta,	1 t. 1 c.	£21
New York,	12 11	252
Brantford,	4 6	86
Havana,	5 1 q.	9

Chemicals (otherwise undescribed)

New York,	1 cs, 4 t. 14 c. 1 q.	£447
East London,	2	8
Colon,	1 keg.	5
Vera Cruz,	2 8 c. 3 q.	102
Santos,	8 pkgs.	160
Rio de Janeiro,	99 cs.	129

Copper Precipitate—

Rotterdam,	47 t. 10 c.	£1 660
Antwerp,	27 14 1 q.	831

Calcium Chloride—

Rouen,	5 t. 6 c.	£9
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Epsom Salts—

Rio Janeiro,	50 kgs.	
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Glycerine—

Madeira,	1 cs.	£5
Vera Cruz,	2 drs.	46
Hamburg,	5 t. 19 c.	170

Iron Oxide—

Rio Grande do Sul,	14 t. 2 c. 3 q.	£35
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Magnesia—

Rio Janeiro,	40 cs.	
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Manure—

Genoa,	56 t. 3 c. 2 q.	£196
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Magnesium Chloride—

Halifax,	4 t.	£16
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Muriatic Acid—

Callao,	10 c.	£6
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Oxalic Acid—

Barcelona,	1 t. 8 c. 3 q.	£60
Oporto,	3	6

Oxolate Potash—

Genoa,	12 t. 8 c.	£409
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Potassium Chlorate—

Philadelphia,	10 t.	£560
Rio de Janeiro,	5 c.	10
Antwerp,	1	42
New York,	18 11	746
Valparaiso,	16	40
Yokohama,	5	210
Genoa,	1	55
Hioogo,	15	800
Hamburg,	13	624
Santander,	10	52
Santos,	3	163

Phosphorus—

Buenos Ayres,	1 t. 8 c. 3 q.	£246
Havana,	18 3	219

Potassium Bichromate—

Havre,	19 c.	£30
Yokohama,	11 t. 8	404
Rio de Janeiro,	3 2 q.	44

Potassium Carbonate—

New York,	7 t. 4 c.	£108
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Picric Crystals—

New York,	10 c.	£85
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Potash—

Amsterdam,	1 t. 7 c.	£29
Monte Video,	6 3 q.	40

Potassium Muriate—

St. John's,	1 t. 19 c. 1 q.	£16
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Phosphate—

Hamburg,	54 t.	£220
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Potassium Prussiate—

Rio de Janeiro,	10 c.	£36
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Salt—

Antwerp,	46 t.	
Boston,	100	
Calcutta,	3,022	
Cape Town,	74	
Chicago,	190	
Demerara,	40	
Lagos,	107	
Lavannah,	18	
Maroh,	45	
New Orleans,	1695	
Philadelphia,	80	
Portland O.,	100	
San Francisco,	230	
Sydney,	300	
Trinidad,	12	

Soda Ash—

Baltimore,	343 cks.	
Barcelona,	10	
Beyrout,	50 brls.	
Boston,	337 128 tcs.	1031 bgs.
Constantinople,	200 brls.	
Corfu,	50	
Dundas,	18 tcs.	
Malta,	20 cks.	
M. Video,	50	
Naples,	50	
New York,	220 851 tcs.	
Oporto,	21	
Philadelphia,	610	
Puerto Cabello,	16 brls.	
Savona,	33 cks.	
Sherbrooke,	18 tcs.	
Tuticorin,	14 brls.	
Rio Janeiro,	20	
Smyrna,	460	

Sodium Bicarbonate—

Barcelona,	155 kgs.	
Batoum,	60	
Bombay,	20	
Copenhagen,	330	
Catania,	50	
Genoa,	10 cks.	
Hamilton,	50 cks.	
Halifax,	120	
Karachi,	200	
Montreal,	9	
New Brunswick,	50	
Odessa,	100 kgs.	
Talcahuano,	10	

Sodium Silicate—

Corunna,	10 brls.	
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Soda Crystals—

Beyrout,	27 brls.	
Boston,	280	
Constantinople,	197	
Halifax,	25	
Mauritius,	13	
Malta,	50	
New Orleans,	25	
Rotterdam,	20	
Smyrna,	245	
Valparaiso,	50	

Sheep Dip—

Cape Town,	2 t. 5 c.	£49
B. Ayres,	1 13 1 q.	41
M. Video,	200 drs.	47
East London,	10	23

Salammoniac—

Beyrout,	3 t. 11 c. 2 q.	£119
Marseilles,	2 2	71
Alexandria,	1	34
Havana,	3	5
Malta,	5	8

Sodium Sulphate—

Philadelphia,	5 t. 2 c. 2 q.	£26
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Saltpetre—

Pernambuco,	1 t. 5 c.	£30
Valparaiso,	8 5 1 q.	176

Saltonake—

Baltimore,	231 t. 12 c.	£402
Philadelphia,	5	12
New York,	25	50

Sodium Potash—

Bari,	2 q.	£10
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Superphosphate—

Stettin,	100 t. 1 c. 1 q.	£312
Hamburg,	210 1 1	707

Sodium Nitrate—

Malaga,	3 t.	£26
Shanghai,	5 2 c.	£46
Ancona,	12 2 1 q.	103
Cartagena,	3 2	35

Sodium Chlorate—

Vera Cruz,	1 ck.	£3
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Sodium Biorate—

Rotterdam,	10 c. 1 q.	£15
Shanghai,	1 t. 3 3	34
Antwerp,	5 17 3	163

Sulphur—

St. John's N. F.,	1 t. 9 c.	£12
Pernambuco,	1 2 3 q.	7
Boston,	58 1	259
Halifax,	30 2	135
Calcutta,	1	7

Sulphuric Acid—

Santos,	10 pkgs.	£15
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Sodium Phosphate—

Pasages,	10 c.	£14
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Tartar—

New York,	12 t.	£1,140
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Wool Acid—

Vera Cruz,	6 cs.	£16
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Zinc Oxide—

Santos,	1 t.	£22
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Zinc Chloride—

Halifax,	1 t. 3 c. 1 q.	£9
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HULL.

Week ending Dec. 24th.

Alkali—

Fiume,	18 cks	
Harlingen,	75	
Hango,	4 drms.	
Venice,	31	
Trieste,	10	

Bleaching Powder—

Fiume,	1 ck.	
Trieste,	21 cks.	
Venice,	10	

Bone Size—

Harlingen,	10 cks.	
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Chemicals (otherwise undescribed)

Amsterdam,	200 cks.	
Antwerp,	1	
Bremen,	30	
Copenhagen,	3 pkgs.	
Christiania,	82 5 cs.	19 drms.
Dunkirk,	33	
Fiume,	22	
Gothenburg,	2 4 12	
Hamburg,	13 4 1	
L. bao,	5	
Riga,	50	
Rotterdam,	60 50 40	
Reval,	37 100	
Stettin,	24 100	
Trieste,	73	
Venice,	45	

Caustic Soda—

Copenhagen,	130 drms.	
Riga,	810	
Reval,	66	
Trieste,	113 cks.	

Dyestuffs (otherwise undescribed)

Antwerp,	1 dr.	
Hamburg,	1 1 cs 4 cks.	
Rouen,	3 bls.	
Rotterdam,	30 20 pkgs.	

Manure—

Antwerp,	30 t.	
Esbjerg,	1,700 bgs.	
Hamburg,	188	

Pitch—

Antwerp,	107 t.	
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Slag—

Hamburg,	328 t.	
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TYNE.

Week ending Dec. 25th.

Alum—

Newfairwater,	1 t.	
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Alkali—

Amsterdam,	5 t. 10 c.	
Reval,	9 15	

Bleaching Powder—

Newfairwater,	57 t. 19 c.	
Amsterdam,	20 1	
"	18 3	
"	26 3	
Pasages,	5 4	
Reval,	70 7	
Antwerp,	21 7	
Hamburg,	21 14	
Gothenburg,	15 2	
Baltimore,	50 5	
Christiania,	10 4	
"	1 4	

Caustic Soda—

Antwerp,	1 q.	
Christiania,	7 t. 17 c.	
"	6 11	

Litharge—

Hamburg,	12 c.	
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Manure—

Hamburg,	50 t. 8 c.	
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Magnesia—

Hamburg,	3 c.	
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Paraffin Wax—

Danzig,	10 t	
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Pitch—

Antwerp,	1 q.	
"	110 t.	

Potassium Chlorate—

Hamburg,	5 c.	
Riga,	4 19 c.	

Plumbago—

Bilbao,	2 t. 9 c.	
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Soda Ash—

Newfairwater,	50 t. 14 c.	
Antwerp,	13	

Soda—

Newfairwater,	4 t. 19 c.	
Amsterdam,	2 10	
"	23 6	
Launceston,	43 14	
Antwerp,	2	
"	1	
Aarhus,	23 3	
Christiania,	10	

Salt—

Laur.

Sulph

Gothe

Sodium

Hami

Sodium

Baltin

Sodium

Bilbac

Sodium

Christ

Sodium

Bilbac

THURSDAY, JANUARY 9, 1890.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary

Acids:—				£	s.	d.					£	s.	d.	
Acetic, 25 %, and 40 %	per cwt	7/6	& 12/-				Lime, Acetate (brown)				8	0	0	
Glacial	"	2	10	0			" (grey)				14	0	0	
Arsenic, S.G., 2000°	"	0	12	0			Magnesium (ribbon and wire)				per oz.	0	2	3
Chronic 82 %	nett per lb.	0	0	6½			" Chloride (ex ship)				per ton	2	7	6
Fluoric	"	0	0	3½			" Carbonate				per cwt.	1	17	6
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	6½			" Hydrate				"	0	10	0
(Cylinder), 30° Tw.	"	0	2	11			" Sulphate (Epsom Salts)				per ton	2	15	0
Nitric 80° Tw.	per lb.	0	0	2			Manganese, Sulphate				"	18	0	0
Nitrous	"	0	0	1½			" Borate (1st and 2nd)				per cwt.	60/- & 42/6		
Oxalic	nett	0	0	3½			" Ore, 70 %				per ton	4	5	0
Picric	"	0	1	5			Methylated Spirit, 61° O.P.				per gallon	0	2	2
Sulphuric (fuming 50 %)	per ton	15	10	0			Naphtha (Wood), Solvent				"	0	3	6
" (monohydrate)	"	5	10	0			" Miscible, 60° O.P.				"	0	4	0
" (Pyrites, 168°)	"	3	2	6			Oils:—							
" (" 150°)	"	1	6	0			Cotton-seed				per ton	22	10	0
" (free from arsenic, 140/145°)	"	1	10	0			Linseed				"	22	10	0
Sulphurous (solution)	"	2	15	0			Lubricating, Scotch, 890°—895°				"	7	5	0
Tannic (pure)	per lb.	0	1	0½			Petroleum, Russian				per gallon	0	0	5½
Tartaric	"	0	1	4			" American				"	0	0	6½
Arsenic, white powdered	per ton	12	10	0			Potassium (metal)				per oz.	0	3	10
Alum (looselump)	"	4	12	6			" Bichromate				per lb.	0	0	4
Alumina Sulphate (pure)	"	5	0	0			" Carbonate, 90% (ex ship)				per ton	18	5	0
" (medium qualities)	"	4	10	0			" Chlorate				per lb.	0	0	4½
Aluminium	per lb.	0	15	0			" Cyanide, 98%				"	0	2	0
Ammonia, 880 = 28°	per lb.	0	0	3			" Hydrate (Caustic Potash) 80/85 %				per ton	23	0	0
" = 24°	nett	0	0	1½			" " (Caustic Potash) 75/80 %				"	21	15	0
" Carbonate	nett	0	0	3½			" " (Caustic Potash) 70/75 %				"	20	15	0
" Muriate	per ton	24	0	0			" Nitrate (refined)				per cwt.	1	3	6
" (sal-ammoniac) 1st & 2nd	per cwt.	36/- & 34/-					" Permanganate				"	4	5	0
" Nitrate	per ton	40	0	0			" Prussiate Yellow				per lb.	0	0	9½
" Phosphate	per lb.	0	0	10½			" Sulphate, 90 %				per ton	9	10	0
" Sulphate (grey), London	per ton	12	5	0			" Muriate, 80 %				"	7	15	0
" (grey), Hull	"	12	2	6			Silver (metal)				per oz.	0	3	7½
Aniline Oil (pure)	per lb.	0	0	10			" Nitrate				"	0	2	5½
Aniline Salt	"	0	0	9			Sodium (metal)				per lb.	0	4	0
Antimony	per ton	75	0	0			" Carb. (refined Soda-ash) 48 %				per ton	5	5	0
" (tartar emetic)	per lb.	0	1	1			" " (Caustic Soda-ash) 48 %				"	4	2	6
" (golden sulphide)	"	0	0	10			" " (Carb. Soda-ash) 48 %				"	4	12	6
Barium Chloride	per ton	7	0	0			" " (Carb. Soda-ash) 58 %				"	5	12	6
" Carbonate (native)	"	3	15	0			" " (Soda Crystals)				"	2	12	0
" Sulphate (native levigated)	"	45/- to 75/-					" Acetate (ex-ship)				"	15	10	0
Bleaching Powder, 35 %	"	5	5	0			" Arseniate, 45 %				"	10	0	0
" Liquor, 7 %	"	2	10	0			" Chlorate				per lb.	0	0	6½
Bisulphide of Carbon	"	12	15	0			" Borate (Borax)				nett, per ton	29	10	0
Chromium Acetate (crystal	per lb.	0	0	6			" Bichromate				per lb.	0	0	3
Calcium Chloride	per ton	2	0	0			" Hydrate (77 % Caustic Soda)				per ton	8	5	0
China Clay (at Runcorn) in bulk	"	16/- to 32/-					" " (74 % Caustic Soda)				"	8	0	0
Coal Tar Dyes:—							" " (70 % Caustic Soda)				"	7	10	0
Alizarine (artificial) 20 %	per lb.	0	0	9			" " (60 % Caustic Soda, white)				"	6	10	0
Magenta	"	0	3	9			" " (60 % Caustic Soda, cream)				"	6	2	6
Coal Tar Products							" Bicarbonate				"	5	0	0
Anthracene, 30 %, f.o.b. London	per unit per cwt.	0	1	1			" Hyposulphite				"	5	0	0
Benzol, 90 % nominal	per gallon	0	3	6			" Manganate, 25%				"	8	5	0
" 50/90	"	0	2	8			" Nitrate (95 % ex-ship Liverpool)				per cwt.	0	8	4½
Carbolic Acid (crystallised 35°)	per lb.	0	0	11¾			" Nitrite, 98 %				per ton	27	0	0
" (crude 60°)	per gallon	0	2	10			" Phosphate				"	15	15	0
Creosote (ordinary)	"	0	0	2			" Prussiate				per lb.	0	0	6
" (filtered for Lucigen light)	"	0	0	3			" Silicate (glass)				per ton	5	7	6
Crude Naphtha 30 % @ 120° C.	"	0	1	2			" " (liquid, 100° Tw.)				"	3	17	6
Grease Oils, 22° Tw.	per ton	3	0	0			" Stannate, 40 %				per cwt.	2	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	12	0			" Sulphate (Salt-cake)				per ton	1	5	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	6			" " (Glauber's Salts)				"	1	10	0
Coke-oven Oils (crude)	"	0	0	2½			" Sulphide				"	7	15	0
Copper (Chili Bars)	per ton	51	7	6			" Sulphite				"	5	5	0
" Sulphate	"	23	10	0			Strontium Hydrate, 98 %				"	8	0	0
" Oxide (copper scales)	"	52	10	0			Sulphocyanide Ammonium, 95 %				per lb.	0	0	7¾
Glycerine (crude)	"	30	0	0			" Barium, 95 %				"	0	0	5½
" (distilled S.G. 1250°)	"	55	0	0			" Potassium				"	0	0	7¾
Iodine	nett, per oz.	8d.	to	9d.			Sulphur (Flowers)				per ton	7	0	0
Iron Sulphate (copperas)	per ton	1	7	6			" (Roll Brimstone)				"	6	0	0
" Sulphide (antimony slag)	"	2	0	0			" Brimstone: Best Quality				"	4	15	0
Lead (sheet) for cash	"	17	0	0			Superphosphate of Lime (26 %)				"	2	10	0
" Litharge Flake (ex ship)	"	18	0	0			Tallow				"	25	10	0
" Acetate (white ")	"	23	10	0			Tin (English Ingots)				"	101	0	0
" (brown ")	"	19	0	0			" Crystals				per lb.	0	0	6¾
" Carbonate (white lead) pure	"	19	0	0			Zinc (Spelter)				per ton	24	7	6
" Nitrate	"	22	5	0			" Chloride (solution, 96° Tw.				"	6	0	0

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Notices.

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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CURRENT TOPICS.

MORE FINANCIAL.

IT is rumoured that negotiations for the purpose of amalgamating the *Standard* and *Financial* papers, somewhat similar to the *Standard* proposal has already been well considered by some of the leading managers.

It would take a very wise man to put a wild proposal; but we hear the promoters are generally hopeful, they themselves, hope in their schemes, and the laudable British public, but in this instance they seem to sit down and count the cost, and find it profit nowhere. Manufacturers will assist in the improvement of their process of engineering.

SMOKE AND COAL.

How times have changed since the day when one Edmund Rowe was tried, convicted, and sentenced for the crime of burning sea-coal in London—was issued forbidding its use in London when prelates of the Established Church took town on account of the noisome smell by the burning of sea-coal—"when London would not come into any house where coals were burned, nor eat of the meat taken with sea-coal." London alone burnt 1,000,000 tons last year.

The question now is: with all our machinery, coal be burned without causing so much smoke, which we reply: most assuredly, provided we wish this object attained go about the matter in the right way. It is now an open question whether a project of a large fund for testing certain appliances is bound to end in failure through the apathy of the steam engine. The *Manchester* appeal has been like the motion picture has brought forth nothing but the mistake to presume that the steam engine is the subject of economy in the combustion of fuel, economy that produces black smoke. It is more in steam raising than the mere fire heat units, but this is not always patent on the loudest on the smoke question.

Many times in these columns have we pointed out that the ordinary householder is as much a manufacturer, and that it is the individual who causes so much destruction to vegetation of our large towns. Has any serious attempt been made to force the householder to feel his responsibility?

PETROLEUM DANGER.

When the petroleum steamer blew up, the public was placed in a state of great alarm of a new danger. When the petroleum steamer took fire in the river Wear, at Sunderland,

tocsin was sounded again in many quarters. When will our capitalists learn that the handling of hazardous goods should only be entrusted to those who possess the necessary technical qualifications? We shall await the Board of Trade enquiry with interest, but at the same time the thought strikes us that many new industries have been nipped in the bud by the short sightedness of the introducers; if a little more of the profits were spent in providing good technical advice, so much better would it be for all parties concerned.

ELECTRIC LIGHTING DANGERS.

A paper, by Mr. Chas. W. Vincent, in the current issue of the *Nineteenth Century*, is well worth reading. The subject is "The Dangers of Electric Lighting," and, though we by no means share his alarmist views, there is a great deal we should all bear in mind. There is no doubt that the use of electricity is extending, and that very rapidly, so that it is imperative everyone should have a good general knowledge respecting it. There seems a desire in many quarters to intensify the dangers that might arise from the introduction of electricity, but this can in most instances be traced to interested sources.

A writer in the *Newcastle Daily Chronicle* tells us he has "personally experienced shocks of 500 volts. and upwards without receiving the slightest injury," but he should consider that we are not all electrical salamanders.

SOIL.

SINCE the system of artificial fertilisation is based upon the addition to the soil of the materials wanting in it, it is of the greatest importance to know the composition of the land which is to be treated, and the analysis of arable soils has therefore come to be of much importance in scientific agriculture.

M. Gosselet, professor of geology to the faculty of science at Lille, has pointed out in his recent lectures on the geology of the department of the Nord, the interest attached not only to the study of the soil itself, but also to that of the sub-soil, which, it is obvious, must exert considerable influence on the properties of the arable soil. M. Gosselet defines the soil and sub-soil as follows:—

To farmers, the soil is that part of the earth which they work, which is impregnated with organic detritus and which furnishes support and nourishment to plants. The sub-soil is the layer immediately underlying this, which is not disturbed by the ploughshare. The soil is merely a portion of the sub-soil which has been repeatedly broken up and enriched by manure and fertilisers. It follows that a knowledge of the sub-soil is necessary to enable the nature of the soil itself to be comprehended. Many of our agriculturists do not appear to suspect this. Led away by the wonders of chemistry, they imagine that they know all about their fields when they have taken up a shovelful of earth here and there and had it analysed. This soil, however, taken from the surface, alters every year according to the culture to which it is submitted, and the particular material thus removed, according to the various manners with which it is treated, according to the action of the rain in washing out soluble matter, or bringing to it substances from its neighbourhood. But what can chemical analysis tell as to the physical properties of the soil, its permeability, its density, its structure?

The various samples taken from the same property are still frequently mixed and the mixture analysed, which is very like ascertaining the value of an orchard, by taking a fruit from each tree and making a preserve from the collection. Hitherto the French farmer has been indifferent to geology. He will wait to learn it until he has suffered from the applications of it made by foreign competitors.

The idea entertained by geologists of the soil and sub-soil is quite opposed to the preceding. For them the arable portion has no interest; it is an artificial product, and is neglected. They call soil the superficial layer formed under the influence of denudation and deposition, which have fashioned the surface of the earth during the last geological periods. The sub-soil is composed of more ancient layers, which, in our country at least, are of aqueous origin, and which have contributed their fragments to constitute the present soil.

The terms soil and sub-soil on French geological maps have to be interpreted in this way. Those constructed to a small scale only show the soil; others, on a larger scale, such as the new geological map of Belgium, show both soil and sub-soil; whilst others, again, show the soil occasionally, but are mainly intended to represent the sub-soil. Of this kind are maps on a moderate scale, such as that of France on the scale of one-eighty thousandth.

Legal.

THE ALLEGED NUISANCE AT MASSEY BROOK BONE WORKS.

A CASE of considerable interest to manufacturers on the one hand, and to property owners on the other, was tried in the Nisi Prius Court at the Liverpool Assizes on the 18th and 19th ult., when Mr. Justice Charles, sitting without a jury, heard the Chancery Action—*Rylands and another v. Gibson & Co.* The plaintiffs were represented by Mr. Gully, Q.C., Mr. Joseph Walton, and Mr. Rylands, and the defendants by Mr. Bigham, Q.C., Mr. Pickford, and Mr. Maberly.

The Massey Brook Bone Works are situated about 500 yards from Massey Hall, Thelwall, a handsome mansion built by the late Mr. Rylands upon an estate of 38 acres purchased by him in 1882. When Mr. Rylands died in February, 1887, he left the house and estate to his wife, Mrs. Caroline Rylands, and the reversion to Mr. Lewis Gordon Rylands. These are the plaintiffs in present action.

Mrs. Rylands did not continue in the house long after her husband's death. It was put into the hands of an agent for sale, but various negotiations for its purchase fell through, on account, it is said, of the unpleasant odours emanating from the bone mill adjacent.

The works in question have been in existence some 40 years, and have, during that time, been used for various purposes. The present defendants came into possession of them in 1885, and commenced the business of bone boiling, erecting amongst other plant a chimney about 100 feet high. From this date the nuisance seems to have made itself felt, and from this chimney were evolved the odours that have given rise to the action.

The process of boiling has been carried on in three pans, holding 2, 3, and 7 tons of bones respectively. It lasts about 48 hours, and the liquor is subsequently drawn off into an evaporator, where it is concentrated to a thicker consistency. The steam and organic vapours driven off from the pans and evaporator were taken into the boiler flue, and, for the defence, it was submitted that this treatment was sufficient to ensure the combustion of all the offensive volatile organic matters, and effectually prevent the escape of unpleasant odours from the chimney top. It was further suggested that the smells complained of arose from nightsoil being conveyed along the canal or spread upon the surrounding fields; from the Bridgewater canal itself; or even from a pond in the plaintiffs' own grounds. The case for the defendants was also supported by the evidence of Dr. Burghardt and Mr. Charles Estcourt, both analytical chemists, of Manchester, who spoke to the excellence of the arrangements at the works for dealing with the matter, and to the impossibility of offensive smells proceeding from the chimney. Witnesses on the other side, however, were unanimous as to the existence of the evil, and in their belief that it proceeded from the bone mill chimney. What might be called the low level nuisance, arising from the "green" and boiled bones in stock, would not travel nearly so far as Massey Hall. Letters of complaint had been addressed by Mrs. Rylands to the Lymm Local Board in 1886, and again in 1888, but to no purpose.

His Lordship gave judgment on Friday. He said that in that case Mrs. Caroline Rylands and another sought an injunction to restrain the defendant, who traded under the name of Gibson & Co., from causing certain offensive odours which the plaintiffs alleged proceeded from his works. The claim originally was for damages for injury to the plaintiffs' premises in consequence of the emission of those odours, but that was not insisted upon at the hearing, and the plaintiffs confined themselves to an application for an injunction to restrain the defendant from continuance, or repetition, of the nuisance alleged to have been committed by him. The plaintiffs' premises were originally bought by the late Mr. Peter Rylands, somewhere about the year 1882. They consisted of a house, which he enlarged when he purchased the property, together with a considerable number of acres surrounding it. The late Mr. Rylands resided there until his death in 1887; not all the year round, because during a part of the year he was in London. He died in the early part of 1887, and Mrs. Rylands continued to reside there until October, 1888. Between the beginning of 1887 and October, 1888, however, she placed the property in the hands of a house-agent, with a view to it being let; but from then until the present time the property had remained unlet, in consequence, it was alleged, of the offensive odours which were given off from the defendant's works and reached the garden and windows of the plaintiff's house. The property was a valuable one. It cost a good many thousand pounds when it was bought, but according to the valuation now placed upon it by the agent who was called it had depreciated considerably, owing to the alleged nuisance from defendant's works. The house was in a neighbourhood which was distinctly residential, and that was a very material matter to be considered in a case of that kind, for there could be no doubt that the old doctrine of what was called going to a nuisance was no longer law. A person must not be too particular if he planted him-

self in a neighbourhood which was a distinctly manufacturing one, but in the present instance, the neighbourhood was a residential one in the proper sense of the word. Although evidence was called on the part of the defendant to the effect that it had become a manufacturing neighbourhood, the preponderance of evidence went to show that at present it was distinctly a residential one. Warrington was several miles off, Lymm being the nearest place to plaintiff's residence. He had, therefore, to deal with the question of whether the works, as carried on by the defendant, affected a house in a residential neighbourhood. The works had been in existence for some 40 years, and had been used for various purposes, for the grinding of bones, as a tannery, colour works, and for carrying on the trade of a fellmonger. The defendant bought them in 1885, and he then commenced the trade of which complaint was now made. He paid a considerable sum, £6,000., for the works, and had expended £4,000. more on them. Mr. Bingham had laid stress on that fact, and used it as an argument why the Court should be very cautious in granting an injunction preventing the defendant from carrying on his trade. That trade had been described at length by the witness Meldrum, whose evidence was admitted, on the part of the defendant, to be substantially accurate. Bone-boiling was one of the trades mentioned in the Public Health Act as being of a noxious character, and it was admitted by the defendant that within 50, or 30 yards of the works an extremely disagreeable smell was perceptible; but he said that it arose, not from the process of bone-boiling as carried on by him but from the stuff which he collected upon the premises for the purpose of being boiled—bones, carrion, and sweepings of all sorts, which were brought and stacked there; or, if it did not arise from that, it was suggested that it came from the product of the boiling which was kept upon the premises for some little time after the boiling. It was stated that since the month of September, 1888, further precautions had been taken with regard to the treatment of the steam, whereby all offensive matter had been extracted from it before it got into the atmosphere. The defendant, however, in his evidence did not represent the altered arrangement as an additional precaution against smell. Quite the contrary; he said it was an alteration in the character of the works, not for the purpose of preventing smell, but for the general betterment of the works. One of the witnesses for the defence—Battersby, of Lymm Hall—said that he had never had any trouble from the works, but on cross-examination it appeared that he lived a mile and a half away from them. The evidence of the witness Greening was of more importance. Greening lived near to Mr. Bleckly, who was one of the witnesses for the plaintiffs, and what he stated was in direct contradiction to Bleckly, namely, that there was no smell from the works. In addition to those and other witnesses who lived in the neighbourhood, two chemists were called, and gave evidence which, having regard to that which had been laid on behalf of the plaintiffs before the Court, was somewhat remarkable. After visits to, and inspections of, the works, they arrived at the conclusion that no smell whatever came from them. The arrangement of the steam pipes was, they said, the very best possible arrangement for the prevention of smell, and no smell could issue from the chimney. It was, however, of little use for scientific witnesses to come and say, "this thing cannot happen, by all the laws of science it cannot happen," when there was such an overwhelming body of evidence to the effect that it did happen. Dr. Fox gave evidence in contradiction of all the witnesses on both sides, for he said that the smell from the manure deposits and the canal might be confounded with the smell from the bone works. It was absolutely incredible that all those witnesses could have made a mistake and confounded the manure and canal with the bone works smell. Plaintiffs showed that whenever the wind was blowing in a south-easterly direction the smell from the works reached the house. Mr. Bleckly had described the nuisance by many adjectives, and had remarked that "smell" was a complimentary epithet to apply to it; it ought to be called a stench. The witness complained to Mr. Gibson and received an explanation, which apparently satisfied him, that on the day on which he complained that the smell existed the works were not in operation, so that the nuisance must have arisen from some other cause. Just about then Mr. Brentnall made a similar complaint to the defendant, and threatened to lay a complaint before the Local Board. The defendant replied threatening proceedings, whereupon Mr. Brentnall seemed to have withdrawn entirely. After giving full weight to all the evidence offered, he could not doubt that there did issue from the chimney at the defendant's works an offensive smell, and that it rendered appreciably less comfortable the plaintiffs' premises. It was not necessary in a case of that kind that the nuisance should be injurious to health; the smell in question was not injurious to health. He had no doubt whatever that the odours which were—in spite of the evidence of two scientific witnesses—emitted from the chimney were such as rendered the occupation of the plaintiffs' premises less comfortable and of less value. Under the circumstances, therefore, he felt that he ought to grant the injunction asked for. Having regard to the evidence of the scientific

men, he had very little doubt that his decision would not necessarily result in the stoppage of the defendant's trade. There seemed to be a high probability that more efficient precautions might be taken whereby no nuisance would be occasioned, but it was his duty to grant an injunction restraining the defendant from repetition of the nuisance, with costs.

On the application of Mr. Maberley, execution was stayed for a month, pending appeal, on defendant paying costs to plaintiffs' solicitors, the latter giving an undertaking to return the money if judgment were reversed.

ALUMINIUM.

It has frequently happened in the history of chemical industry that by some improvement in the process of manufacture the cost of a valuable substance is considerably lessened, so that its useful properties are placed within the reach of those who may find employment for them. Such is notably the case with the metallic element aluminium, which, until quite recently, has partaken more of the nature of a chemical curiosity than of a substance which might, under any circumstances, come to be generally used by the manufacturer or industrial artist. A few years ago aluminium sold at 40s. *per ounce*, and was manufactured by the pound, but recently the process for its production has been so simplified that it now sells at 20s. *per pound*, and is manufactured by the ton. This revolution in its manufacture is due to the investigations of Mr. Castner. Large quantities of sodium are used in the process, and it has been more in the direction of cheapening the cost of production of sodium that the improvement in question has been effected; in truth, the original process remains practically the same as a chemical operation. And by this means the valuable properties of aluminium are placed within the reach of the engineer, the sculptor, the instrument-maker, and the mechanician generally, in whose hands they promise a wide application. What these properties are, and how they may be applied, may not be altogether devoid of interest at the present time. To begin with, aluminium is widely distributed among the materials forming the earth's crust, being present (in a combined form, of course) in large quantities in clay; so that the raw material from which it is extracted may be obtained in abundance. The properties which chiefly recommend it for wider use are its lightness, tensile strength, durability, and malleability. Its specific gravity is about 2.6, while iron is 7.8; in other words, a given volume of aluminium will only weigh one-third of the same volume of iron. Again, its tensile strength is about 14 tons per square inch, thus comparing favourably with wrought iron. Its ductility and malleability are quite as good as gold or silver; observing certain precautions it may be drawn out into fine wire, beaten out as thin as gold leaf, hammered into thin sheets, wrought into plates, or cast into bars. Its melting point is much lower than iron, being about 700° centigrade; recent experiments have shown that it is the best conductor of heat yet known, and it conducts electricity almost as well as copper. It can be alloyed with silver, copper, iron, and most other metals. A finished bar or sheet is capable of taking on a very high polish, equal to that of silver, being, however, superior to silver in respect of its not being tarnished by sulphurous fumes. Lastly, it is not attacked by air or water, so that it cannot rust or wear by any exposure to the elements as in the case of iron. These then are a few of the chief properties of this somewhat remarkable metal, and naturally it will be asked, How are they to be employed?

Combining as it does lightness with strength, aluminium could with advantage be employed in many circumstances where iron can now alone be used. At present its cost precludes its use in large amount, but there are many objects which might be constructed of it. Many of these might be mentioned, but, for example, we may name optical instruments, scientific instruments, cooking utensils, reading lamps, chandeliers, spoons, forks, surgical and dental instruments. In many of these its lightness, and more especially its capability of taking on a high polish which would resist tarnishing, aluminium would be beneficial, and effect a great improvement. Further, we may reasonably look forward with some degree of confidence to the cost of its production being again considerably lessened, and may contemplate the effect of constructing ships, bridges, and many kinds of exposed metal work with aluminium. Its chief advantage in the first of these would be its lightness. It has been estimated that if an Atlantic liner were built of aluminium it would have only one-third the draught, and be propelled with the same engine power at double the speed that it is at present when built of iron—a previsionsary advance in ocean travelling which would place New York within three days of Liverpool. It would also enable vessels of large tonnage to sail up rivers which are at present only navigable to those of light draught. Bridges built of this metal would be quite as strong as built of iron, would only have one-third the weight, and the natural non-tarnishable brightness of the metal would obviate the necessity for its being made hideous with red lead paint to prevent corrosion in a moist atmosphere.

But perhaps the sphere for the most promising employment of aluminium is in connection with its alloys. The result of alloying 10 % of aluminium with 90 % of copper is to produce an alloy of golden colour, capable of taking a high polish, and with a tensile strength exceeding that of wrought iron, and nearly equal to that of steel. This alloy, known as aluminium bronze, is one concerning which great hopes are entertained. It is, of course, much cheaper than aluminium, and hence there may be expected of it a wider use. It makes good castings, and is easily worked under the hammer, its malleability increasing with repeated melting or tempering. It is thus suitable for large castings, such as statues and other large works of art. It is hard enough to be substituted for steel in the bearings and other parts of machines, and also for the manufacture of gun barrels and cannon; in short, aluminium bronze might be substituted for steel in nearly all its applications. When aluminium is added to steel it appears to raise its tensile strength and to lower its melting point. The latter effect is of some advantage in the manufacture of steel castings. It is well known that cast metal often contains blow-holes, due to air or other gases being imprisoned in the molten metal just before solidification takes place. By adding aluminium to molten steel or iron, the melting point of the latter is lowered; it therefore is rendered more fluid, and consequently the possibility of the formation of blow-holes is much lessened. Besides this advantageous use of the metal, experiments at present going on seem to show that more valuable discoveries may yet be made as to the effect of alloying aluminium and steel. Many other possible uses for this remarkable substance could be mentioned; but enough has been said to show that, provided its price comes within the reach of manufacturing industry, there will probably open up many opportunities for its employment, and thus hasten the advent of what has in a prophetic sense been termed the "Age of Aluminium."

NORTHWICH LOCAL BOARD AND THE WIDNES BRINE SCHEME.

THE projected scheme for the conveyance of brine from Wincham to Widnes occupied the attention of the Northwich Local Board on Tuesday night.

The clerk submitted a copy of an intended Act for incorporating and conferring powers upon the Widnes Brine Supply Company to erect a pumping station in a field in the township of Wincham (adjoining the Board's district) for the purpose of pumping brine to be conveyed therefrom through pipes terminating in the township of Widnes, in the county of Lancaster, and also giving the company power from or by their works to supply brine and salt to any person, company or corporation on such terms and conditions as may be agreed upon. He had been asked to make a report upon the Bill. The only report he could make was that the Bill was drawn in the usual form, and that the terms of it were against the best interests of the inhabitants of the Board's district.

Mr. Worsley, with great pleasure, moved the following resolution:—"That the conveying of brine from the township of Wincham to the township of Widnes, as proposed by the intended Act of the Widnes Brine Supply Company, is against the best interests of the inhabitants of the Board's district; and further, the Board by this minute of resolution authorises and directs the Clerk to do all acts and things as may be necessary for preparing and presenting to Parliament a petition against the intended Act."

Mr. Moreton seconded.

Mr. Leicester: What *locus standi* have we, if it is outside the Board's district?

The Clerk asked that no discussion should take place before the petition came up for sealing.

Mr. Leicester failed to see the wisdom of preparing a petition if they had no *locus standi*. Wincham was out of their district, and it would not affect them if they started pumping.

Mr. Worsley's impression was that they had a *locus standi*.

The Chairman (Mr. Clough): It is very desirable that we should stop it, if possible.

Mr. Leicester: Of course; but we shall get stopped on the threshold and told we have no *locus standi*.

Mr. Moreton thought it was worth while making the effort.

Mr. Leicester said it was thought that the pumping of brine at Marbury by the Mersey Salt Company would be prejudicial to Northwich; but they could not stop it.

Mr. Williams: The passing of this resolution does not bind the Board's hands in any shape or form.

The Chairman: We might find ourselves in an awkward position if we did not pass the resolution.

Mr. Leicester: It does not empower the Clerk to incur any expense?

The Chairman: No.

The resolution was then carried *nem con.*

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing water aqueous hydrochloric of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples. On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish, or Italian.

RAILWAY RATES AND CHARGES.

WE have from time to time directed attention to revision of railway rates, says the *South Wales Daily News*, a subject of so intricate a nature that only those directly affected have taken interest in it sufficient to induce consideration of present circumstances. By the act of last year, the railway companies had to submit to the Board of Trade new schedules of rates. This they have done; and the traders of the country having objected to the proposed new rates, it has become the duty of the Board of Trade to make inquiry, and to fix what the new charges shall be. It is now clearly apparent that the railway companies have an intention to increase their charges all round, and to levy terminals where they have never levied them before. They are seeking powers to increase the charges now actually paid by 50 per cent. Last year the railways carried 201,576,616 tons of minerals, at a cost of £16,158,881., and the companies now propose a terminal charge upon minerals ranging from 1s. to 1s. 8d. a ton, which, at the minimum rate of 1s., would add £10,078,830. to the rate on minerals. They carried last year 80,171,823 tons of general merchandise, at a cost of £21,239,841. They now propose to add terminals to this charge, which, upon an average, will yield 3s. 6d. a ton, making £14,015,032. addition to the present charge. These two items of increase amount together to £24,093,862. a year, and as the total of gross receipts last year was £72,894,665., it is nearly one-third of new additional charge, and that will be wholly an increase of dividends to shareholders, as the working expenses will not be increased by a penny. In short, the railway companies are seeking to tax the whole community for their own advantage. Their position is that of landowners exacting an enormous rent by means of protection. The shareholder holds a monopoly, which is protection, and the whole country have to pay him tribute. The enormous traffic upon British railways would enable the companies to pay large dividends if the directors adopted the policy which has proved so completely successful elsewhere: that policy is one directly opposite to existing methods. At present it is the practice to put on traffic the heaviest rates it will bear, instead of developing business by carrying at lowest remunerative charges. In countries which differ as widely as Belgium, Prussia, and Ireland, the policy of reducing rates has been attended with most gratifying results. Lower rates have yielded higher dividends, because of the greatly-increased traffic which has been promoted; and the experience of other countries would be repeated here if their wiser policy were adopted.

SOCIETY OF CHEMICAL INDUSTRY.

MANCHESTER SECTION.

THE members of the Manchester Section of this Society met, on the 7th inst., in the rooms of the Manchester Chemical Club, Victoria Hotel, Mr. James Hart presiding, in the absence of Mr. Ivan Levinstein, the president. The hon. secretary (Mr. J. Carter Bell) read the minutes of the previous meeting, which were approved. A number of contributions were submitted from the laboratory of the Owens College. Dr. Julius Cohen explained a new method of estimating the amount of sulphur in iron and steel; and read a paper which he and Mr. R. W. Oddy had prepared on "A Comparison of the Methods for Estimating Organic Nitrogen." Mr. F. Brownson read a paper by himself and Dr. Cohen on a product of the distillation of resin. Mr. R. W. Oddy read a paper by himself and Dr. Cohen on "The Stability of Permanganate Solutions"; and Mr. James Grant read a paper by himself and Dr. Cohen on "Some Experiments on the Method of Determining Sodium Carbonate in the Presence of Sulphites in Caustic Alkalies and Salts." A discussion followed the reading of these communications. Mr. J. A. Wilson read a paper containing the results of some experiments he has made with the view of ascertaining the rate of distillation of acetic acid. Some discussion followed.

GLASGOW AND SCOTTISH SECTION.

AT the second meeting of the session, held in Glasgow on the 7th inst., Mr. R. R. Tatlock presiding, the chief feature was a paper by Mr. T. L. Patterson, F.I.C., F.C.S., of Greenock, on "The Quantitative Estimation of Colouring Matters by means of their Absorption Spectra." This described the improvements he had managed to effect on the instruments hitherto in use, and detailed the practical experiments from time to time carried out, with the more or less surprising results therefrom obtained. In the spectra of the various well-known oils of commerce (illustrated by diagrams on the board), Mr. Patterson found many interesting suggestions with regard to occult mixing processes of the trade for purposes of adulteration and otherwise. Especially so in the case of fish oils, which (so the spectra shows) appear never, or hardly ever, to reach the consumer without the admixture of one or other of the vegetable oils—chiefly linseed or rape—a singular circumstance at first glance, as the adjunct in this case is dearer than the basis. Mr. Patterson's conjecture is that the dash of seed oil is applied, not as an adulterant, but as an improver or strengthener. The author was cautious in warning his audience that the improved spectroscope thus introduced by him had as yet only a limited capacity of performance, and experiments were frequently without practical result; but he claimed the merits of a new departure to a certain extent, and foresaw from it a quicker and more definite detection of mischievous agents in the mixing and colouring of marketable goods, citing particularly the colouring of confectionery wares and the tinting of various articles of food, regarding which the spectrum obtained from his new instrument had already revealed some curious things. At the conclusion of the paper, which was listened to with manifest interest and attention, the chairman, Mr. Tatlock, who is the city analyst of Glasgow, said that till now he had never found in practice any spectroscopic results sufficiently defined for every-day use, but that it did seem to him, from the paper just read, that quite a new field was now opening up for useful practical work in the determination of quantitative analysis. His own experience in oils corresponded with the experience of Mr. Patterson, and the explanatory conjecture of the latter, he thought, was correct. Thereafter a paper on "The Fixation of Nitrogen" was presented by Mr. Charles A. Fawsitt, F.R.S.E., F.C.S., of the Atlas Chemical Works, Glasgow, which, on the suggestion of the author, was held as read, and discussion postponed until next meeting, when the printed matter would be in the hands of members. Mr. Fawsitt's paper, we believe, after alluding to the importance of the subject from a commercial point of view, and mentioning briefly the properties of nitrogen and its fixation in the atmosphere by the electric discharge, goes on to detail the steps which led on the author to trials on a manufacturing scale for the preparation of cyanides, ferrocyanides, and ammonia, classing these trials as follows:—Passing of nitrogen over alkalis carbon; passing of ammonia over alkalis carbon or charcoal; the processes in which electricity was used to effect the combination of nitrogen and hydrogen; and sundry others, differing from the aforementioned three. The first head includes the extensive experiments of Bramwell and Hughes at Newcastle (1844-1847), on the preparing of prussiate of potash (finally abandoned). The others comprise later efforts, including those of the author himself; and, in conclusion, the inference is drawn that, at present prices, cyanide of potassium would be the best substance to produce, as, per unit of nitrogen, it is by far the most valuable. Ammonium cyanide is selected as being the compound most likely to prove the easiest to prepare in the first place, as it would entail less expense, owing to its not exerting any action on

the retort, and, being volatile, not requiring any lixiviation. In addition to the above, there was also a short descriptive sketch of the salt mines at Khewra, Hindostan, read by the author, Mr. E. Rodger, Glasgow, from notes made during a recent visit.

ELECTRIC LIGHTING IN BIRMINGHAM.

A COMPANY has been formed, with a nominal capital of £100,000, for lighting the Midland metropolis, and it is expected that the system will be completed before next winter. The area to be dealt with includes the central portion of the town, with one or two spurs, and the new illuminant will be available for offices, shops, business premises, public buildings, educational institutions, and hotels. But one station will be employed. The generating apparatus will consist of steam-driven dynamos, with special arrangements for securing continuity and uniformity day and night. The current will at once be sufficient to actuate 5,000 16-candle power or 10,000 8-candle power incandescent lamps, but the mains will be ample for carrying a much larger current. The initial outlay is estimated at £30,000. Arrangements for the public safety have been carefully made. The leads or conductors will lie in V-shaped conduits underground, overhead wires being prohibited; and the pressure of the current will be low, averaging 150 volts. This is a plan which cannot endanger life, the lethal currents, about which so much has been heard, being something like 2,000 volts. The current will also actuate arc lamps should these be desired. The wires of supply will enter the consumer's premises, and the user will have a choice of fittings and appliances. The maximum charge under the provisional order is 10d. per Board of Trade unit—that is, sufficient to run 34 eight-candle glow lamps for one hour; but there may be a sliding scale giving advantage to the large consumer. The current will also be available for motive power.

THE TIN-PLATE TRADE.

EXPORTS FOR 1889.

THE export of tin plates and sheets for the year just ended exceeds that of any previous year in the history of the trade. Over 430,000 tons were exported during the twelve months, representing an aggregate value of over £6,000,000. For the month of December the quantity of exports was below the average for the year, reaching only 29,232 tons; but with the holidays and what not, the last month of a year is seldom a typical one. We append statistics showing the volume of trade for the 12 months:—

Where to.	Tons.	Value. £
Holland	3,795	56,234
Germany	4,179	62,174
France	4,322	62,696
Australasia	6,620	97,726
British North America	15,385	214,338
United States	336,692	4,674,455
Other countries	59,630	862,873
Total	430,623	£6,030,496

It will be instructive to compare the figures for the year just ended with those of the two years which preceded it:

	Tons.	Value. £
1887	353,506	4,792,854
1888	391,361	5,546,228
1889	430,623	6,030,496

No better testimony to the vitality and the development of the tin-plate industry need be sought after than is supplied by the statistics given above, which may be left to tell their own story.

In consequence of the development of the exports of tin-plates from Swansea, the harbour trustees are taking steps to extend the already extensive storage accommodation at the East Dock.

A NEW IDEA.—A cargo of pitch brought by the steamship *Tynedale* has been unloaded at the Reading railroad coal wharves in Philadelphia. The company has a process by which the refuse coal dust, with the addition of pitch, can be made into fuel. The idea is patented, and has already been tried, it is said, with success, but not on so extensive a scale.

GLYCERINE JELLY.—A new cement is described in the *Monde de la Science*, which is attacked neither by petroleum, benzine, turpentine oil, nor any similar liquids. It consists of a mixture of glycerine with gelatine or glue. The product is quite liquid when hot, and resembles caoutchouc when cold, alike in appearance as in its elastic properties. Applied hot to the interior of a barrel or any wooden vessel, the latter is thereby, according to the *Monde de la Science*, made safe for holding any of the above-mentioned substances.

VANADIUM IN CAUSTIC POTASH.*

BY EDGAR F. SMITH.

THE occurrence of vanadium in commercial caustic soda has been noticed. As far as I am aware, it has not been observed in caustic potash, hence the following lines:—

While engaged in making certain decompositions, for which I employed the ordinary stick potash, I was rather surprised, after saturating the alkaline solutions with hydrogen sulphide, acidulating with hydrochloric acid, and heating for several hours, to discover that the separated sulphur showed a decidedly chocolate brown colour. This occurred repeatedly. The quantity of dark material was never very great, yet it was present, even in potash from alcohol. Some preliminary experiments were made which pointed to vanadium. I therefore saturated the warm aqueous solution of three pounds of stick potash with hydrogen sulphide. Heat was applied for several hours longer, and during this period the liquid gradually assumed a yellow to deep red colour. Hydrochloric acid was added to distinct acid reaction. The separated sulphur was quite dark in colour. After filtration and washing, the residue was dried and treated with carbon disulphide to extract the free sulphur. The chocolate coloured mass remaining after this treatment dissolved, with exception of a slight quantity, in yellow ammonium sulphide, from which it was reprecipitated by dilute acid. Again washed, treated with carbon disulphide and carefully ignited, there remained a crystalline mass. With a small quantity of this last product I made the phosphorous bead test—yellow, passing through dark to green when cool. Another special test consisted in dissolving a portion of the ignited residue in a drop of concentrated sulphuric acid, free from iron. One cc. of water was next added, and to this colourless solution from one to three drops of a dilute potassium ferrocyanide solution, whereupon the liquid acquired a fine green colouration. This latter test Dr. Walz (*American Chemist*, vol. vi., p. 453) employed in detecting the minute quantities of vanadium in American magnetites. He considers it conclusive evidence of the presence of vanadium. The most important test, and that which I applied to the remainder of the ignited residue, after effecting its solution in nitric acid, was to add a large piece of ammonium chloride to the ammoniacal solution. The morning following, crystals of ammonium vanadate had separated. These gave the true vanadium bead, and when ignited, moistened with pure, strong nitric acid and evaporated, left the deep red-coloured residue characteristic of vanadium compounds.

The vanadium sulphide, as first obtained, was impure, consequently the reactions were at times masked, and it was only after eliminating some silver and iron that the reactions were unquestionable.

The impure sulphide from the three pounds of caustic potash weighed about one-half gram.

THE NITRATE OF SODA TRADE IN 1889.

THE year's statistics as to the nitrate of soda trade, which are just out, possess considerable interest. They show that during the year there has been a production and export from the producing countries with which consumption in this country and in Europe generally have not kept pace. The total production is estimated at 900,000 tons—about 500,000 by British joint-stock companies, and about 400,000 by private firms and Chilean companies. From all the nitrate ports, however, there have been exported 930,000 tons, as against 750,000 tons in 1888, 400,000 tons in 1886, and 535,000 tons in 1884. Of the exports the United Kingdom has received about 121,000 tons (the quantity in 1888 being 103,000 tons); the Continent, 673,000 tons (the quantity in 1888 being 547,400 tons); and the United States and California, 90,000 tons, other places taking up the balance. Then as regards consumption, the United Kingdom (by deliveries and exports), has disposed of 104,000 tons, the same as in 1888; the Continent has absorbed 575,000 tons, as compared with 532,000 tons last year; and the United States have consumed 80,000 tons, as against 65,000 in the year preceding. It thus appears that while the United Kingdom has received 18,000 tons more than in 1888, and the Continent 126,000 tons additional, there has only been an increased consumption under these two headings of 43,000 tons, and stocks, therefore, have grown substantially. The stocks in this country now stand at 39,000 tons, having risen from 17,900 tons in June last, and they compare with 14,600 tons a year ago. On the Continent the stocks have accumulated from 64,000 tons at the close of 1888, and 93,000 tons six months since to a total of 162,000, which gives a gross increase for the Continent and the United Kingdom on the year of 110,000 tons. The visible supply for the United States (including stock and nitrate afloat) is about 40,000 tons, 12,000 tons in excess of that for last year. Then there are 380,000 tons afloat for Europe, the largest probably on record; the amount for this time 1888 being 325,000 tons, and 1886, 178,000. It is believed that larger stocks exist in the hands of dealers and consumers in the interior of Germany than at date last year, the increased deliveries having been

*Read at recent meeting Chemical Section Franklin Institute.

chiefly since the close of the Spring consuming season. Slightly smaller stocks are believed to exist in producers' hands than at the end of 1888. The visible supply for Europe during the next four months consists of stocks at ports 192,000 tons, and afloat 380,000 tons (or a total quantity (exclusive of stocks in interior or in transit) of about 572,000 tons, against 404,000 tons in 1888. Deliveries for consumption during same period have been, in 1889, 334,000 tons, with an average spot price of 10s. 9d.; in 1888, 351,000 tons, with price 10s. 3d.; in 1887, 246,000 tons, with price 10s. 9d.; in 1886, 212,000 tons, with price 11s.; in 1885, 260,000 tons, with price 9s. 6d.; in 1884, 270,000 tons, with average spot price of 10s. per cwt. The value on spot at date last year was 10s. 9d. to 11s. per cwt., and to-day it is 8s. 4½d. to 8s. 6d. per cwt. The highest point was in January, when 11s. 6d. was reached for small due cargoes, but values gradually receded until 10s. was reached at the close of March, 8s. 6d. at the close of April, and 8s. 1d. in the middle of May for arrived cargoes. The lowest points during the year for distant arrival were about 8s. 9d. in May, and 8s. 3d. per cwt. in November, and the highest 10s. in February and March, and 9s. 3d. in July and August. Holders of cargoes for Spring arrival are firm in their possessions, in the belief that some improvement in the present very low range of value, notwithstanding the large excess in visible supply, is probable during the consuming season. Buyers having already, to a considerable extent, contracted for their requirements for the early Spring, meantime abstain from operating freely, pending some assured action on the part of the producers to restrict production and shipments during 1890. Freight from the nitrate ports have fluctuated from 25s. in February and March, 35s. in June, 37s. 6d. in August and September, to 32s. 6d. in November and December, which is the closing quotation on spot; while for distant loading 35s. per ton has been paid. Last year's range was from 25s. to 35s., the closing rate being 30s. per ton. Exchange has fluctuated from 30d. in January to 25½d. in June, 24½d. in July, 26d. in August, since ruling at 25d. to 25½d. which is the closing rate. Last year's fluctuations were from 26d. in June to 29d. in December. Cost of nitrate, free on board, has ruled from 2dols. 75c. in spring to 2dols. 55c. in June, 2dols. 65c. in July and August, to 2dols. 45c. in November, 2dols. 50c. per quintal being the closing quotation. The shipment duty remains at the equivalent of slightly over 2s. 6d. per cwt.

PAPER MILLS IN INDIA.

THE paper mills industry in India is one of yearly growing importance in the considerable addition it makes to the extent of local manufactures, and the consequently diminished requirements from foreign markets. It is only under the present outlook of the relations of silver that any economic calculations can be projected from any data which can be made to show that the people of this country will need less of the manufactures and productions of other nations owing to enlarged indigenous productions, throwing a large weight in adjusting the balance trade on silver imports and India Council's drawings.

Paper manufacture by steam machinery was first commenced in India by the late John Marshman, at Serampore. Working by a sort of rule-of-thumb process with anything but the most modern machinery—and no scientifically tested process—the highest success scored by the mills was the well-known "Serampore paper." Even that was attained with great difficulty, owing to the effect of climate on the bleaching medium used. After various vicissitudes the mill was broken up, and the King of Burmah became the happy possessor of the machinery, lock, stock, and barrel. There are now nine paper mills—five in the Bombay Presidency, two in Bengal, one at Lucknow, and one at Gwalior. Three of these are under private, and the remainder under Joint Stock Association auspices. These mills manufacture blotting, brown, and white cartridges, white country paper, writing and foolscap papers, and coloured coarse papers. The materials used are wheat and rice straw, rags, various kinds of grasses, old jute, and hemp rope, or bagging, wood-pulp and waste paper. It is needless to say that the supply of rags is of too precarious a character and limited extent to admit of any extension of the quantity of any of the finer class of papers these mills can manufacture. The invested capital in these mills totals up to nearly £500,000. The largest mill is at Bally, and produces yearly about 3,100 tons of paper. The value of the yearly production of all the mills collectively is £29,00,000, and they give employment to about 3,500 people. The sale of the Indian-made paper is yearly increasing, and under more skilled superintendence, and the improved machinery which has recently been imported, the class of paper turned out is of a better quality, and commands a larger sale than hitherto. In the last five years, the value of the paper turned out from the Indian Mills has risen from £18,00,000 to £24,40,000. There is no apparent effect from the local industry on the value of the imports into India from foreign markets; the expansion of the trade has been very great, and the consumption is now very large. In 1867-68 the value of the paper imports was £28,50,000; in 1877-78 £30,50,000, and in 1888-89, £40,26,921.—*Indian Daily News*.

THE WIDNES AND WINCHAM BRINE SCHEME.

WHAT is known as the Widnes Brine Scheme was recently brought under the notice of the Northwich Local Board. From minutes which were read, it appeared that a meeting of the Board, as a committee, was held on the 17th ult., when there were present—Messrs. J. Clough (chairman), Brandreth, Woodcock, Worsley, Rogerson, Molyneux, and Dutton. The meeting was held for the purpose of taking into consideration the application intended to be made to Parliament in the ensuing session, for a bill to incorporate a company and authorise the construction of works for a pumping station in Wincham, in the county of Chester, to the township of Widnes, in the County of Lancaster. The Parliamentary notice and plans having been examined and discussed, it was moved by Mr. Clough, seconded by Mr. Palin, and resolved, that the clerk be authorised to obtain a copy of the proposed bill and report thereon to the board.

The clerk stated that he written to the solicitors of the Widnes Brine Scheme on the 12th ult., asking for a printed copy of the plan referred to in the Parliamentary notice. In reply, Messrs. Bridgman, Weaver, and Kinsey, of Chester, said, "Before agreeing to send them we should like to know on whose behalf you apply for them, and if you or the persons wishing to have them will enter into a guarantee, and undertaking that they shall not be used for opposition on standing orders, we may possibly be able to send them." In reply to that letter on December 17th, the clerk said the plans were for the use of his board, and if they could not furnish them without the guarantee and undertaking referred to, he must withdraw the board's application.

Mr. Maddocks: I will be as concise as possible, and detain you only for a few moments. Having received from our clerk a Christmas greeting, I would like, in the first place, to wish him and all around this board many happy returns of pleasurable Christmas rejoicings. I know no one has the welfare of our town at heart more than our clerk. Therefore, what I cannot help saying in respect to this greeting, I hope he may consider as no disrespect to himself. On the Christmas card the design shows what may portend the future of poor old Northwich—a large steamer about to pass through a bridge or locks, with an immense lot of water about, no land in sight, but a few birds, whether stormy petrels, sea gulls, or rooks, I know not; but if this comes to pass without our compensation scheme created, it will be a very unhappy Christmas some few years hence for a good many of the inhabitants of Northwich. With respect to this new brine scheme, we have already two wealthy bodies doing an immense amount of damage, a great portion of the wealth made here going directly out of our district. Are we to have a third body to deal out more destruction, and the proceeds and profits carried outside? It brings to my mind a very beautiful and pathetic exclamation of our great and intrepid traveller, Mr. H. M. Stanley. Having overcome all dangers and opposition from friends and foes, he cut his way through 400 miles of forest unknown to civilisation, executed faithfully his orders, relieved the distressed, and brought them safe out of their difficulties, he uses these words:—"I feel like a labourer returning home on a Saturday night, having done a good week's work, with well-earned wages in my pocket, and ready for the Sabbath of to-morrow." There is a good deal more in these words than is represented in their literal sense. Our great traveller has well earned his fortune; he will be protected with the same by our laws; he will be an honoured and highly-esteemed guest of the nobles of our land, and undoubtedly patronised by her most gracious Majesty, our Empress and Queen. D. V., he will have every opportunity of making ready for that eternal Sabbath of the morrow, which most people are wishful to attain. Well, sir, we have many unknown Stanleys in Northwich. We have our block miners, immured from early morn till late at night; we have our saline mineral makers, in the vapour heat of mid-day and midnight; we have our flat people going through their daily routine of life—a love, just as Mr. Stanley's, at times hazardous and dangerous to life, for, as we know, many have lost their lives in these avocations. Collectively, many of these people are in a much different position with regard to their Sabbath than Mr. Stanley. Take the words of our chairman, Mr. Gough, before Mr. Ritchie, on the subsidence question:—"The subsidences did away with a great deal of property, some of it belonging to men who had worked hard all their lives, whose property represented their life's savings, and whose savings were thus ruined." On the one side (Mr. Stanley's) you have peace, contentment of mind, a desire to fulfil the duties of life honourably, and contemplate calmly the coming east. On the other, some people may be so constituted that they, through anxieties, have a general dissatisfaction with life, at variance with their fellow-beings, and in a state of opposition to an all-wise Providence. Then, sir, take estates, where men have honestly obtained, by the sweat of the brow, that which should be a permanent income for generations. I contend these so-called estates are just as worthy of the full protection of our laws as those of the greatest noblemen of our land. For argument's sake, place in juxtaposition the estate of his

Grace the Duke of Westminster and Lord Egerton's by the side of Mr. Pickering's, of Dane Bridge, and Mr. Lamb's, of Leicester-street. Had either of these noblemen gone through the same anxiety and distraction of mind, and the same losses, I venture to say you would have a law made to-morrow, in the Houses of Lords and Commons, to meet difficulties in connection with the same. These are only instances of many others. Then, sir, as to excuses in denying justice, look at the huge amount of wealth going out of our districts. May I ask you how many vendors to the Salt Union there were in the salt trade? You agree that about forty will represent the whole lot. Now, we will throw over the three-quarter million of money, entirely, a portion capitalised to expenses, purchases, &c., and take simply the three millions. In ordinary business transactions of life you can always have a return of $2\frac{1}{2}$ to 5 per cent. What is $2\frac{1}{2}$ per cent. on this three millions? Only £25,000. per annum. Then take the profits of Messrs Brunner, Mond and Co., where entire strangers come into your district, making a limited company amongst strangers, and within ten years pay off their original capital nearly three times over, at the present time paying 25 per cent. What does one-fifth of their profits mean, still leaving a dividend of 20 per cent? It means over £40,000. per annum, together £115,000. per annum. And, gentlemen, £8,000., which you, as a Board, have asked for, is denied. We are to have a definite reply from the Salt Union meeting, I presume, early in January, and I do hope in the meantime every endeavour will be made to have all our details ready. I say our present position is a disgrace to civilisation; it is a disgrace to our noblemen of Cheshire to quietly see and know this still to exist; and it is a disgrace to ourselves as a community. I do hope we shall be prepared and able to have some mite of equity accorded us.

RELATIVE VALUE OF VARIETIES OF LOGWOOD.

L. BRUHE, who has examined a large number of specimens of the logwood of commerce, maintains that the statement occurring in many text books, even such as have been published by prominent authorities, that the name of the wood is at once the criterion of its value, the brands, San Domingo, Yucatan, Monte Christo, and Laguna being generally considered the best, and the others as of inferior value, is incorrect. The author gives his grounds for this assertion in the following analyses of samples:—

Name and mark of woods.	Water.	Ash.	Com-bustible matter.	Alcohol-ic ex-tract.	Ethe-real ex-tract.	Resi-due.	Yield of ex-tract.
	%	%	%	%	%	%	%
Yucatan logwood	13'00	1'09	65'71	37'46	60'12	2'42	20'20
Laguna logwood	12'38	0'96	65'66	47'95	1'37	0'68	21'00
Domingo logwood	13'19	1'88	70'73	53'47	44'95	1'58	14'02
Monte Christo logwood, 1884 ..	13'20	2'94	65'11	60'32	32'00	7'78	18'75
Monte Christo logwood, 1887 ..	14'70	1'03	70'27	54'10	34'72	11'18	14'00
Fort Liberte logwood, 1886-87	13'10	0'82	65'75	54'11	1'89	4'00	20'33
Fort Liberte logwood, 1887 ..	10'12	0'88	73'00	47'92	50'00	2'18	16'00
Fort Liberte logwood, 1885-86	12'11	2'03	68'41	45'17	59'72	5'21	17'45
Fort Liberte logwood, J. B., 1887	11'84	1'03	69'13	34'81	59'24	5'95	18'00
Yucatan logwood, E. J.	14'51	1'20	66'95	38'51	58'34	3'15	17'34
Domingo logwood, D.	13'71	2'14	64'85	50'32	43'81	5'81	19'30
Jamaica wood ..	14'10	1'14	66'06	50'50	43'20	6'30	18'70
Jamaica wood ..	12'10	1'30	68'60	50'71	43'05	6'24	18'00
Jamaica wood, roots	15'30	2'30	71'70	30'12	52'99	16'89	10'70

THE LONGEST TELEPHONE LINE.—The longest one in Europe is that now laid between Pesth and Prague. It is 600 kilometres in length, or about 375 miles. The trials just made on this line of communication are reported highly satisfactory. It is, we may note, nearly double the distance between Paris and Brussels.

MR. CHRISTIAN ALLHUSEN, founder of the Newcastle Chemical Works, and for many years chairman of the Newcastle and Gateshead Chamber of Commerce, died yesterday morning at his residence, near Windsor. The deceased gentleman, who was 83 years of age, was a recognised authority on trade matters, and he rendered material assistance to the late Mr. Cobden in concluding the commercial treaty with France.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- PETER.—The number is out of print, but we will publish the table again as it has had a large sale.
 ENQUIRER.—The journal circulates very largely amongst the Allied Industries.
 Q. E. D.—By no means. 2. We cannot advise you.
 SUBSCRIBER.—If you will send us your full name and address we will insert your query as you have written it.
 L.—E.—Don't try to appear funny.
 A READER.—We trust you have received our almanac by this time.
 C. T. B.—Thanks for the newspaper. The local news is always a source of interest.
 OILMAN.—Certainly; the oil and colour trade cannot be conducted without some knowledge of technology.
 C.—We will send a representative over to see the apparatus if you will make an appointment.
 R. B.—We have tried the process in our laboratory, and have met with nothing but failure.
 MANUFACTURER.—Call at our offices; we shall be pleased to talk over the matter with you.
 COAL.—The matter would take too much space to explain here. 2. Yes. 3. Be careful how you play with fire.
 CHEMICAL.—We have received many similar complaints, but have not printed them, as our solicitors call them libels.

PLATE GLASS.

ALTHOUGH the foreign manufacturers of plate glass have lost their hold on this market through the enterprise and ability of American producers, the condition of trade in their home markets more than makes amends for the loss. They are united in a strong combination, and with an unusually large consumption in all parts of Europe, and no surplus stock anywhere, they are getting good prices.

The foreign manufacturers of plate glass are encountering the same difficulty that is said to obtain in this country, namely a scarcity of skilled labour. Particular difficulty is experienced by them in finding men who are qualified to fill the office of manager, and on this account the building of several new works, that have been projected, is at a standstill.

A plate glass factory is to be built at Dusseldorf, Germany, and another is reported for Monstier, Belgium. Plans have also been drawn for a works at Auvclais, which is but a few miles from Monstier.

A plate glass works, which is the first of its kind in that country, is now being built at Pisa, Italy, and is almost completed. It is a branch establishment of a French firm of manufacturers, whose principal factory is one of the largest of that kind in the world.

THE LISHMAN SYSTEM OF SMOKE PREVENTION.

THE Lishman system of perfecting combustion and preventing smoke has been submitted to a further test at the works of Messrs. Inglis and Wakefield, Busby, near Glasgow, with satisfactory results. The apparatus, in the instance referred to, was attached to two Lancashire boilers, 28 feet long by 7 feet 6 inches in diameter, and Scotch coal was used as fuel. A Scotch newspaper thus describes the test:—"By invitation of Mr. Thomas Lishman, the inventor of the Lishman steam generator, we had the pleasure of seeing one of his improved methods of perfecting combustion and preventing smoke as applied to the ordinary Lancashire type of steam boilers at the works of Messrs. Inglis and Wakefield, Busby. In this instance the apparatus was attached to two boilers, to each of which there are two furnaces. There are other four boilers of recent construction, of similar dimensions, connected with the same chimney stack. For the purpose of efficiently testing the merits of the invention for preventing smoke, advantage was taken of the opportunity afforded for so doing when the other boilers had finished working, so that no smoke could be emitted from the chimney but from the two boilers to which the patent was applied. After work had ceased at one o'clock operations began, all four fires being cleared and clinked previously. The fuel was levelled in the furnace, then tried in the usual way, each furnace in succession being similarly treated. The chimney top was anxiously watched by the spectators. From their firings no smoke was perceptible. The fires were then stoked, and fresh fuel to each furnace supplied, when nothing more than a light stream of thin vapour issued from the chimney. To prove the difference of the two systems three of the other boilers of similar dimensions delivering into the same chimney were fired up in the ordinary way, when, immediately afterwards, dense volumes of black smoke issued from the chimney. The trial, which lasted over an hour, clearly demonstrated that smoke from Scotch coal can practically be prevented by the application of this method. The main feature of the apparatus consist of a blower, through which the air at a

pressure is introduced. The air for sustaining combustion is conducted by a conduit to the front of the boilers where it is delivered into a receiver placed below the floor plates. A cast or wrought iron pipe is placed on the floor of each furnace, connected at the one end to the air receiver, and at the other end to an internal air-box. This pipe is perforated on each side, from which air is equally distributed to the fuel and the bars. Air is also, in regulated quantities, admitted to the air-box behind the bridge, wherein it is highly heated and distributed by means of about 100 small orifices into the escaping gases from the fuel chamber. Air is also admitted in a number of rectangular streams at the front of the fuel. There are 226 thin streams of air operating upon the fuel and gases at right angles to the currents, and thereby the gases become thoroughly mixed and the combustion perfected. The apparatus is of a very simple nature, and easy to deal with."

SUPPLIES FOR THE NEW YORK ARSENAL.

THE following is a list of bids for furnishing supplies to the New York Arsenal, which we take from the Government *Advertiser*:

- CHEMICALS, SALTS, GUMS, ETC.
 10 gals. acid, carbolic, 45c. per gal., bidder, Charles H. Pleasant.
 25 lbs. acid, muriatic, 6½c. per lb., do.
 10 lbs. acid, hydrochloric, 8½c. per lb., do.
 50 lbs. acid, nitric, 42° specific gravity, 10½c. per lb., do.
 25 lbs. acid, oxalic, 11c. per lb., do.
 8 ozs. acid, citric, 4c. per oz., McKesson and Robbins.
 100 lbs. acid, sulphuric, 66°, 5½c. per lb., Chas. H. Pleasant.
 1 lb. acid, acetic, 14c. per lb., do.
 100 gals. alcohol, grain, 95 per cent., \$2. 18 per gal., do.
 2 lbs. alum, powdered, 4½c. per lb., Geo. Gabb's Sons.
 25 lbs. ammonia, aqua, FFFF, 9c. per lb., Chas. H. Pleasant.
 5 lbs. ammonia, sulphide, 50c. per lb., McKesson and Robbins.
 20 lbs. borax, pulverised, 10c. per lb., Charles H. Pleasant.
 5 lbs. chalk, red, lump, 8c. per lb., McKesson and Robbins.
 50 lbs. chalk, white, lump, 1¼c. per lb., do.
 100 lbs. copper, sulphate (blue stone), blue vitriol, 7c. per lb., Chas. H. Pleasant.
 500 lbs. electrophone fluid, in carboys, net weight (carboys to be returned to pier 6, N. R.), \$3 95, bids rejected.
 30 grs. gold, chloride of, 3¼c. per gr., McKesson and Robbins.
 100 lbs. gum arabic, 75c. to 45c. per lb., do.
 100 lbs. gum camphor, bids rejected.
 5 lbs. of shellac, gum, 25c. per lb., McKesson and Robbins.
 5 lbs. shellac, white, 27c. per lb., do.
 100 lbs. glue, common, No. 1¼, 11c. per lb., Geo. Gabb's Sons.
 50 lbs. glue, white, best quality, 21c. per lb., do.
 5 lbs. glue, cabinetmakers' best, 12c. per lb., McKesson and Robbins.
 48 boxes lye, concentrated, 1 lb. boxes, 7c. per box, Charles H. Pleasant.
 2 lbs. iron, photosulphate of, 8c. per lb., do.
 75 lbs. of mercury, for battery purposes, 54c. per lb., McKesson and Robbins.
 1 oz. mercury, bichloride of, C. P., 25c. per oz., C. H. Pleasant.
 50 lbs. potassa, chlorate of, 15½c. per lb., McKesson and Robbins.
 30 lbs. of potassa, bichromate of, 14c. per lb., do.
 2 lbs. potash, carbonate of, 16c. per lb., C. H. Pleasant.
 2 lbs. potash, neutral oxalate of, 24c. per lb., McKesson and Robbins.
 1 lb. potash, yellow prussiate of, 26c. per lb., C. H. Pleasant.
 2 ozs. potassium, bromide of, 4c. per oz., McKesson and Robbins.
 2 lbs. potassium, nitrate of, C. P., 12c. per lb., C. H. Pleasant.
 30 lbs. sal ammoniac, for Leclanche battery, 10c. per lb., do.
 50 lbs. sal soda, 2c. per lb., do.
 12 ozs. silver, nitrate of, 63c. per oz., do.
 25 lbs. soda, hyposulphite of, 4c. per lb., do.
 2 ozs. soda, acetate of, 12c. per oz., do.
 2 lbs. soda, sulphate of, crystals, 4c. per lb., do.
 5 lbs. of soda, carbonate of, 4c. per lb., McKesson and Robbins.
 50 lbs. strontia, nitrate of, 12c. per lb., do.

WILL OF THE LATE MR. WOOLLEY.—Probate of the will, dated August 18th, 1885, of the late Mr. Harold Woolley, of Harefield, Holland-road, Crumpsall, and of Manchester, pharmaceutical chemist, who died on October 16th last, leaving personality valued at £30,225. 19s. 7d., has been granted to the executors, Mrs. Woolley, Mr. Ewar Christensen, of Christiana, and Mr. James Lowndes, of Manchester, to each of whom, as executor, the testator bequeaths £50.; to Mrs. Woolley £100., and his plate, pictures, furniture, and household effects. He devises all his real estate, and bequeaths the residue of his personal estate in trust to pay the income thereof to Mrs. Woolley for her life, and on her death to distribute the estate in equal shares amongst all his children.

EXPORTS OF MINERAL OILS FOR NOVEMBER, 1889.

S. G. Brock, Chief of the Bureau of Statistics, submits the following statement of the exports of domestic mineral oils from the United States for the month of November, 1889:—

MINERAL OILS, CRUDE.

(Including all natural oils, without regard to gravity).

	Gallons.	Dollars.
Total for Nov., 1889.....	8,742,471	565,968
Total for Nov., 1888.....	9,899,857	694,816
Total for 11 months ending Nov. 30, 1889.....	77,668,868	5,534,347
Total for 11 months ending Nov. 30, 1888.....	73,912,428	5,185,851

NAPHTHAS.

(Including all lighter products of distillation).

	Gallons.	Dollars.
Total for Nov., 1889.....	1,801,999	158,124
Total for Nov., 1888.....	1,924,097	153,075
Total for 11 months ending Nov. 30, 1889.....	13,506,696	1,161,642
Total for 11 months ending Nov. 30, 1888.....	12,273,998	986,027

ILLUMINATING OILS.

	Gallons.	Dollars.
Total for Nov., 1889.....	41,336,076	3,063,109
Total for Nov., 1888.....	39,443,136	3,177,012
Total for 11 months ending Nov. 30, 1889.....	504,696,021	37,372,850
Total for 11 months ending Nov. 30, 1888.....	414,845,229	33,880,346

THE MODE OF APPLICATION OF MANURES.*

THE essential condition, the *sine qua non*, for the mineral nourishment of plants by the soil is that the nutritive substances be brought into immediate contact with the roots. At all events, in the case of materials which are insoluble in water, as are the phosphates, we must not in any way count upon the so-called nutritive solution of the soil; the solution of the phosphate is effected through the membrane of the radicle, and by means of the acid juice of the latter, so that it is absolutely necessary that there should be direct contact between the two. Since, moreover, the plant cannot go in search of its nourishment, the latter must be disseminated throughout the soil in such a way that the proper nutritive elements are provided in proximity for each root.

The main object of the farmer at the time of spreading manure on his fields should, therefore, be to incorporate it as thoroughly as he can with the layer of earth in which the roots seek their nourishment. We cannot rely on the rain to bring into circulation the necessary materials, for even the substances which are soluble, such as ammonia, potash, and free phosphoric acid, are almost immediately rendered insoluble by their contact with the soil, by reason of the absorbent power common to all arable earths. Once brought into this condition they become incapable of being dissolved and brought into circulation by the rain, while this is, of course, also true for the matters which were originally insoluble. It is, therefore, by mechanical means, by harrowing, etc., that the fertilising materials must be disseminated and brought within the reach of the roots. The more frequent the contact between the radicles of the plant and the particles of fertilised soil, the better will be the nutritive effect of the latter, and, consequently, the greater crop. The well-known favourable action of tillage thus receives, in my opinion, a more complete explanation than is given by those who only see in it the results of the more complete aeration and disintegration of the soil, although these effects are also of great importance.—*L'Engrais*.

A NEW ELECTRICAL FACTORY.—The electrical factory just erected in the Paris markets is in the cellars at the most central point. There are two installations. The first has six generators. The cellars are lighted with 450 incandescent lamps of 16-candle power, and 180 are lamps of a lighting power of 30 candles. In the market and the adjoining streets there are 2,000 lamps. The entire works have cost the City of Paris £40,000, of which £1,800 was spent on the main chimney, which rises to a height of 147 feet.

*Extracted from the new work by M. Grandcau. *L'Epuisement du sol et des récoltes*. Librairie Hachette, Paris.

ELECTRIC TRANSMISSION OF POWER.

THE electric transmission of energy for mining operations has been making rapid progress during the past few years both at home and abroad; and now we may safely assume electricity to be one of the recognised means of distributing energy below ground. Indeed, it is probable that no mining engineer would nowadays put in new plant without first taking into serious consideration the comparative cost and advantage to be derived from its use. Electricity is coming into favour for several very important reasons, chief among these being the cheap and efficient manner in which power can be transmitted through long distances. When electricity is more extensively used, the best part of the underground work of collieries will be done by this means. The ease with which energy can be carried by the copper conductors will commend electricity, and by its means power will be taken into parts now inaccessible, except to hand and horse labour. Indeed, it is not improbable that, in some of the colliery centres, where a number of pits is worked within a comparatively small area, large power-stations will be erected on similar lines to the central lighting stations. From these centres power will be distributed to motors below ground. The cables in many cases will be run on the surface and carried below through special boreholes of small diameter. The cost of insulation in the cables will be by this means much reduced. Mechanical coal-cutting is likely to receive a new impulse now energy can be cheaply supplied at the "faces," and assuming such machines are used in non-gaseous seams, the cost of coal-getting should be reduced very considerably. In America there are already some four or five different types of electric coal-getters working successfully. In England Messrs. Blackman and Gooldeen, at Allerton Main and other collieries have made considerable progress. Their cutter is a high-speed rotary-bar. Messrs. Immisch are also giving this important branch their consideration, not only with reference to getting coal, but also for drift-driving and rock-drilling generally. The electric work hitherto done in England has been so successful that we look to a large increase in the present year.—*Engineer*.

CHINESE PRODUCTS.

THE British Consul of the Ichang district reports that White wax ("insect wax," produced by the *Coccus Fe-la*), shows a great and continued increase in quantity, but the value is less than in 1887, the price having gone down.

The customs tables show an export of vegetable tallow, 400,341 pounds, valued at £4,233. Besides the ordinary vegetable tallow from the stillingia, there is a kind obtained from the seeds of the varnish tree, used for candles for the hot weather. The export of varnish was 65,227 pounds, value £2,918. Varnish is produced in the highlands westward of Ichang: some, perhaps most, of it appears to find its way to the Yang-tze lower down than Ichang.

The exports described under the general name of medicines are more than in any previous year. The same is the case with nut-galls. So also with musk, the export of which, more than two tons, seems enormous for such an article. Safflower shows an increase on the preceding year, but is less than in two of the former years; so also with rhubarb.

Of native opium, large quantities are brought down from Szech'wan by porters travelling overland; but probably not much comes into Ichang except for local consumption, the route striking the Yang-tze somewhat lower down. In the latter part of 1887, a station was established inland, westward from Ichang, to collect a tax on opium brought down overland, instead of collecting it at Sha-sze, alias Sha-shih on the Yang-tze below Ichang). I fear however, that this expedient has not been very successful.

COAL: HOW ACQUIRED, HOW SPENT.—It is calculated that the space of time required for the production of the South Wales coalfield was about 640,000 years. The coal measures consist of various seams, and between these seams occur layers of sandstone and shale beds which must have evidently been formed under water. The land has alternately sunk and risen. Whilst it was above water huge tropical forests sprang up, and then they were submerged, to be covered with the deposits of rivers in estuaries. The combined thickness of coal in South Wales is about 120 feet, and it is reckoned that a bed three feet in thickness took a thousand years to form, but as this coal is interspersed with about 120,000 feet of sandstone, the time for the deposition of this strata must be added, which runs to the 640,000 years already mentioned. At the rate it is being extracted now a few hundred years will observe the last of it. Talk about a miser and a spendthrift son, not one of the former ever hoarded his wealth with the care or patience of Nature, nor did one of the latter ever squander his paternal inheritance with the extravagance of mankind in regard to the coal.

Trade Notes.

AN ELECTRO-TECHNICAL EXHIBITION.—A committee has been formed at Frankfurt to arrange for the holding of an International Electrical Technical Exhibition from June to October this year.

OTTO VON GUERICKE'S AIRPUMP.—The Mayor of Magdeburg's air-pump has been presented to the Berlin Physical Society, the President of which has just been showing that this ancient instrument is still in good working order. But as it was made in 1675, it cannot be Otto Von Guericke's first air-pump, inasmuch as it was in 1650 that he invented the machine.

AN ELECTRIC TYPE WRITER.—Mr. F. Higgins, a well-known electrician, has given the title of electric type writer to an instrument which he has invented and improved for printing news, transmitted with electricity, on a sheet of paper, in manner similar to that of the ordinary type writer. A single wire transmits the news from a distance to the new machine, which, by electrical power, prints the words, as they are transmitted, in clear type, on a sheet of paper—not a tape—with proper spaces between the words and between the lines.

THE BIOGRAPHY OF COLONEL NORTH.—It was stated, when Col. North went to Chili, that Dr. W. H. Russell accompanied him in the capacity of his biographer. Nothing has been heard of the book since the return of the party, but the idea has not been abandoned. Dr. Russell is, in fact, now at work upon its production. It will be illustrated by Mr. Melton Prior, and will be produced in what the Nitrate King regards as a manner worthy of the subject.

LOCH KATRINE WATER.—The monthly report of the quality of Loch Katrine water, prepared by Professor E. J. Mills, D.Sc., F.R.S., Glasgow and West of Scotland Technical College, has been issued. The results are returned in parts per 100,000:—Total solid impurity, 2.6; organic carbon, .129; organic nitrogen, .029; nitric nitrogen, .003; ammonia, .000; total combined nitrogen, .032; hardness, 1.11; chlorine, .75. Temperature, 53.8 C. = 128.8 Fahr. The water was sampled on December 16th. It was brown in light colour, and contained a little suspended matter.

AMERICANS MANUFACTURING PATENT FUEL.—It has been told how the Canadians had determined to convert their mountains of sawdust into patent fuel, and now news comes from Philadelphia that the vast quantities of coal dust annually produced throughout the Pennsylvania coal fields are to be treated in the same manner as is done in South Wales. The plant has been constructed in the most substantial manner, and the Reaving Anthracite Compressed Fuel Company is already in operation, turning out blocks which burn readily, giving an intense heat, with an entire absence of clinkers.

PAPER FROM SAWDUST.—Ottawa—a great timber emporium—has for years been puzzled by the problem associated with the disposal of the vast quantities of sawdust. At last the happy idea has been hit upon of converting it into paper. A mill has been constructed capable of treating 12,000 tons of sawdust annually. The paper from this material can be made so thick and strong that when tarred and dried it can be used for building purposes, while paper of a finer quality can be obtained by adding one-fourth of wastepaper to the sawdust pulp.

WATER GAS.—The North British Water Gas Syndicate seem to have had a lively meeting in Glasgow on Friday, the 10th inst. A resolution was proposed in favour of the appointment of a committee to investigate the position and prospects of the company, including all facts relating to the patents and the promotion of the undertaking. The resolution was rejected by 35 votes against 27, the directors opposing the appointment of a committee of investigation.

* * *

We don't want to work,
But by jingoes if we do,
We've got the men, we've got the fools,
We've got their bawbees too.

MR. PICKARD, M.P., ON THE PRICES OF COAL.—Yesterday, Mr. B. Pickard, M.P., who has for the last fortnight been confined to bed, left Barnsley for Southport. Speaking to the representatives of the press, the hon. gentleman said he was surprised at the continued advance of prices of coal. House coal had gone up 4s. or 5s. per ton since 1888, gas coal 2s. a ton since last July on contracts, and they did not know how much otherwise. Engine fuel had gone up from 3s. to 8s. 6d. per ton, and coking fuel 166 per cent. The men were getting 30 per cent. on the getting price of 1s. 6d. per ton, or 5d. per ton more money. If the owners considered the men would be content with that, they were making a great mistake. Referring to the movements of the men in the north of England for a 15 per cent. advance, Mr. Pickard said that coke had risen in value from 17s. to 37s. per ton, and the owners could give 150 per cent. if they chose. Half the coal got in Durham was coking coal, and the men were getting from 6½d. to 9½d. per ton for getting it.

NEWCASTLE GAS SUPPLY.—Mr. John Pattinson, city analyst, reports to the Corporation:—I have the honour to report to you the following results of my testing of the illuminating power and purity of the gas supplied to this city by the Newcastle-upon-Tyne and Gateshead Gas Company:—Date of testing, 9th January. Illuminating power in sperm candles, 15.6; grains of sulphur in 100 cubic feet of gas, 8.46; sulphuretted hydrogen nil. According to Act of Parliament, the gas, when tested, should not be of less illuminating power than 15½ standard sperm candles, nor contain more than 20 grains of sulphur in 100 cubic feet. The gas should also be quite free from sulphuretted hydrogen.

CREMATION.—Cremation is making rapid advance in public favour. The first cremation at Woking was conducted in the spring of the year 1885. About 50 cremations have taken place since last May, when operations were resumed after the entire reconstruction of the building hitherto existing there, and the addition of the handsome little chapel. On several occasions there have been two bodies cremated on the same day. Not only is hostile sentiment giving way, but it is beginning to be found that for middle and upper class funerals cremation is really cheaper than burial. The total cost of it, including everything ordinarily implied when we speak of a funeral, is stated to be £15.

ARSENIC IN THE OFFSPRING OF A POISONED MOTHER.—In connection with the foregoing there is brought to mind Roussin's experiments, whereby it was found that arsenic is capable of replacing, to a partial extent, the phosphorus of the calcium phosphates in bone. Having injected calcium arsenate into a rabbit, M. Roussin found that the bones of the young rabbits, born of the poisoned animal, contained a considerable quantity of arsenic. Also, that their urine deposited in noteworthy proportions ammoniacal-magnesian arsenate. But M. Pouchet's experiment does more than confirm M. Roussin's observation. For it proves that not only is calcium arsenate fixed in the bone, but arsenic in the condition of arsenious acid (white arsenic), or sodium arsenate, which, in the substance of the bone, combines with the lime to form calcium arsenate, after all traces of the poison have vanished from the viscera.

CANADIAN PHOSPHATES.—Returns which are now appearing in Canada indicate that the past season has been a fairly prosperous one in the phosphate industry. The exports of rock phosphate from Montreal to Europe during the season of navigation amounted to 23,540 tons, an increase of no less than 9,000 tons as compared with the season of 1888. In addition 2,565 tons of ground phosphate went to the United States from the Ottawa Valley, and 361 tons from the Kingston mines, making a total export to the United States of 3,026 tons. The quantity held over is estimated at 5,000 tons. This season's production of 32,466 tons is an increase of about 9,000 tons as compared with either 1888 or 1887. It is noteworthy, too, that the exports to Europe—that is, substantially to Great Britain—which were in 1882 only 6 per cent. of the total imports, and in 1886 12 per cent., are now over 70 per cent. of the total imports.—*Canadian Gazette.*

THE DEVELOPMENT OF THE PETROLEUM TRADE.—Russian petroleum is rapidly overhauling the American article. From 1883 the exports of the latter have remained stationary, whereas those of the former have jumped with wonderful bounds. In the first of these years America sent us 1,329,004 barrels, while Russia supplied us with only 502. In 1889 America shipped to this country 1,465,265 barrels, and Russia 701,924. But the output shows a more remarkable development. In 1882 the daily quantity in the United States was 82,303 barrels, and this declined in 1888 to 46,707 barrels, whereas the daily output from Baku rose to 14,850 barrels in 1882 to 56,601 barrels in 1888. In the matter of transport Russia has proved to be quite as fertile in resource as her American rival. There are now 62 tank steamers employed in the transport of oils from the United States and Batum. By these means the oil has become very much cheaper to the consumer. At Cardiff and Swansea some endeavours have been made to afford accommodation for the trade, and more should certainly be done, for in six years the imports have been nearly doubled.

THE NEW ASBESTOS COMPANY, LIMITED.—The New Asbestos Company, Limited, has been formed to acquire and carry on as a going concern, and to develop and extend a very important asbestos industry, thoroughly established and in complete working order, known as the "Société Française des Amiantes," of Tarascon. The Tarascon Company was incorporated in France in the latter half of last year, and its business proved a great success. No doubt can be entertained as to the fact that it is capable of enormous development. It has been found that further capital is necessary to keep pace with and adequately meet the increasing volume of business. It is with this view, and in order to secure the benefits of English capital and co-operation, that the present company has been formed. Judging by the commanding position occupied by similar companies, notably Bell's Asbestos Company, the present undertaking offers excellent opportunities for investment. The capital is £120,000, divided into 30,000 shares of £4 each, and there is a present issue of 25,000 shares, whereof the French proprietary of the Société Française des Amiantes take 8,332 shares.

THE PHONETIC JOURNAL.—The first number of the *Phonetic Journal* (Isaac Pitman's weekly shorthand journal) for this year is particularly interesting. In addition to the usual five large pages of shorthand, with key, it contains an amusing article from the pen of the well-known phonographer, Mr. T. A. Reid, on "How to save 6,000 years," by means of shorthand, and a chapter on the "Early Days of the Newspaper Press," forming the first of a series of articles on the "Newspaper World." Mr. Pitman, in his "Annual Address" records a most remarkable extension of his system of shorthand during the past twelve months; speaks of its having been introduced into workhouse schools, and says that shorthand has received a fuller recognition by the House of Lords and the Civil Service. Schools are also taking up the teaching of shorthand largely, as it is one of the most useful studies for boys who are going to business. Mr. Pitman promises an enlargement of his Journal next year, when it will enter on its 50th volume.

Market Reports.

THE LIVERPOOL COLOUR MARKET.

COLOURS remain unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

The improvement in our market, previously reported, has not only been well maintained but a further advance has taken place in most minerals. Manganese: Arrivals continue small, whilst stocks are very much reduced, and prices have further advanced. Magnesite: Raw lump unchanged, raw ground £6. 10s., and calcined ground £10. to £11. Bauxite (Irish Hill brand): The demand is unusually strong, and the production can scarcely keep pace therewith; sales, therefore, are being made at full, and in some cases advanced, prices. Lump done at 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine; arrivals continue. French chalk: Arrivals have been pretty large during the week, but practically the whole has gone straight into consumption. Our market, therefore, is unaffected, and prices continue strong, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate) steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate unchanged; best lump, 35s. 6d.; good medium, 50s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone is unchanged; ground at £10., and specially selected lump, finest quality, £13. Iron ore: The improvement continues, with a prospect of further advance in prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 14s. to 18s. Purple ore 12s. 6d. Spanish manganiferous ore fully sold, but orders are being taken for forward delivery at 27s. 6d. for 20 per cent. Emery-stone: best brands scarce, and bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls, £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal more inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore, best qualities, in request at higher prices. Antimony ore and metal has further advanced. Uranium oxide 24s. to 26s. Asbestos: Best rock £17. to £18.; brown grades, £14. to £15. Potter's lead ore dearer; Small £12. to £13.; selected lump, £14. to £15. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native) £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand, brings full prices; 50s. for ground English. Felspar: 40s. to 50s.; Fluor-spar, 20s. to £6.; Bog ore in good demand for best quality—22s. to 25s. Plumbago: More offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, scarce on spot—20s. to 22s. 6d. Ferro-manganese

selling at very much higher prices. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best 30s. to 35s. (at Runcorn).

REPORT OF MANURE MATERIAL.

The increased activity indicated in our last report continues, and a very considerable business has been concluded during the week in phosphatic material.

There would be buyers of Charleston River phosphate rock at 11d. per unit, in cargoes c.f. and i. to U.K., but in the absence of offers from the other side we do not hear of any business. For Somme phosphates the prices quoted in our last still hold for early shipment, but they would not be accepted far ahead. Owing to strikes there is difficulty in shipping Belgian, and contracts will only be accepted with ample margin in time for shipment. The quotation is 7½d. c.f. and i. for 40/45%, and as much as 10½d. is asked for 48/53%. We do not hear of any transactions in Canadian, producers still refusing to name any possible prices. £5. 12s. 6d. bid and refused for a small November cargo of River Plate bones, but it would be accepted for a December shipment of larger size. There are several cargoes wanted for U.K., and it looks as though buyers would have to come up to sellers' ideas of prices. Several parcels of crushed East Indian bones arrived have been sold at £5. 12s. 6d., and there would be further buyers for immediate delivery. There are buyers for shipment at £5. 7s. 6d. and sellers at £5. 10s. Owing to arrivals East Indian bone meal has been somewhat easier, but the quay having been cleared at £5. 10s., there is nothing now to be had on spot under £5. 12s. 6d., and that price would have to be submitted "to arrive."

Nitrate of soda remains very dull; 8s. 4½d. is full value on spot for fine quality, and 8s. 3d. would buy ordinary. Due cargoes are worth about 8s. 4½d., and November shipments 8s. 7½d., but there is still much indisposition to speculate in this article, and consumers are buying from hand to mouth. The quotations for dried blood, ground hoof, &c., remain without change, and there are no important transactions to report.

The tendency of supers is to harden, and value of 26% is now 47s. 6d. and 50s. per ton in bulk, f.o.r., according to position of works.

Manufacturers have still large purchases to make, but before completing they would like to see their stocks of manures moving into consumption.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

In general chemical saltcake and alum are slightly easier, and the bichromate works are perhaps less well supplied with orders than is desirable; but nearly all the other lines are healthy, having further added to the firmness announced a week ago. Bleaching powder experiences a steady recovery so far, and soda crystals, partly because of certain important trade changes on the Tyne, are run up higher than for a long time. Caustic sodas (except in the highest strength, which is steady at £9.) are again dearer and in enhanced enquiry; soda ash, refined alkali, and chlorate of potash, are all also the turning of the scales to the good. Water gas circles here are much agitated, and the North British Directorate had a bad quarter of an hour at last week's shareholding meeting, although victorious in the final voting. The meeting of the paraffin scale and wax British-American delegates has been put off some few days without a definite fixture; but the representative of the Americans is now here, and the important business on hand will be consummated one way or other within very brief space. Paraffins are meanwhile all firm except burning oil and naphtha, the latter having lost part of recent gain. Lubricating oils still harden. The sulphate of ammonia market is idle for the moment, but stocks are not large and a rally is probable. To-day £12. 2s. 6d. Leith cannot be got, but on the other hand, it does not appear that less has been taken. Chief prices current are:—Soda crystals, 47s. 6d. and 50s. net Tyne; alum in lump, £4. 17s. 0d., less 2½% Glasgow; borax, English refined £30., and boric acid, £37. 10s. net Glasgow; soda ash, 48/52, 1½d. less 2½% Tyne; caustic soda, white, 76°, £9. 70/72, £7. 15s., 60/62°, £7., and 60/62° cream, £6. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5., and 1 cwt. casks, £5. 5s. net Tyne; refined alkali, 48/52°, 1½d., less 5% Tyne; saltcake, 26s. to 27s.; bleaching powder, £6. 2s. 6d. to £6. 10s.; less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¼d., less 5% any port; nitrate of soda 8s. 4½d. to 8s. 6d., sulphate of ammonia, £12. to £12. 2s. 6d. f.o.b. Leith; salammuniac, 1st and 2nd white, £36. and £34., less 2½% any port; sulphate of copper; £23. 10s., less 5% Liverpool; paraffin scale, hard, 2½d., soft, 2d.; paraffin

wax, 120°, semi-refined, 2½d.; paraffin spirit (naphtha), 9d.; paraffin oil (burning), 6¾d. to 7d., at Glasgow; ditto (lubricating), 865°, 5s. to 5s. 10s.; 885°, 5s. 10s. to 6s. 0s.; and 890/895°, 5s. 10s. to 6s. 10s. Week's imports of sugar at Greenock were 57,332 bags.

TAR AND AMMONIA PRODUCTS.

TUESDAY.

Benzoles are still very firm, and it is expected they will rise higher yet; by some dealers the price of 90's is set at 3s. 8d., and 50/90's at 2s. 10d., but as a rule purchasers do not rise to such high figures. One point is certain that there are no stocks of benzol awaiting sale, and we have news of more carbonising works being projected, though it is very probable that with coal at the present price we may find the uninitiated burning their 'prentice fingers. Solvent naphtha and creosote continue in good demand, and though carbolic acid is in good request for the manufacture of explosives, the price is low. Anthracene has been moving off well of late, and prices quoted in our last report hold good for to-day. Pitch is rather easier, but former prices are still current at all ports.

The sulphate of ammonia market is neglected, and prices have drooped to £12. 1s. 3d., or even £12. f.o.b. Hull, and the same values for Leith. Beckton price is now down to £12., and outside London makes find buyers with difficulty at £12. 2s. 6d. Enquiries have reached us asking how this is, in face of dear nitrogen in manures. The reply is simple, the "bear" speculators have led foreign buyers to believe that if they only hold off the market, they will be able to get sulphate at their own price, but it is quite probable that in holding off too long they may have to pay a largely advanced price in the Spring. Sulphate makers would do well to note this and act accordingly.

MISCELLANEOUS CHEMICAL MARKET.

During the past week there has been a strong demand for soda ash, and the prices have advanced; spot values may be taken as 1½d. for caustic ash and 1¾d. for carbonate. Bleaching powder remains in the same position as last advised both for spot and forward deliveries. Chlorate of potash decidedly firmer at 4¾d. White caustic soda has also advanced, and is extremely scarce on the spot, most makers being sold for some time to come. Values to-day, for 70's., 5s. 8d. per ton, and for 60's., 5s. 7d. per ton f.o.b. Liverpool. Sulphate of copper still in good request at £24. per ton, and there is no sign of weakness in this article. Acetates and acetic acids in all grades continue to receive more inquiry, and prices for early deliveries are firm, as per list in prices current. Carbolic acids, crude and crystal, are still in uncertain position as to the future. Spot prices are, for crude, 60's., 2s. 11d., and for crystal, 34's. 11¾d. Prussiate of potash firm, 9¾d. and 10d. Bichromates of potash and soda are in abundant supply, and without change in prices. There is still a general good demand for all heavy chemicals, and the influence of higher prices in wages and fuel is manifest in the upward tendency of values in the same.

Gazette Notices.

PARTNERSHIPS DISSOLVED.

MARSHALL, KINDER AND CO., Denton, hat manufacturers.
RITSON AND CO., Gateshead, electrical and mechanical engineers.
W. W. LECOMBER AND J. A. FIELDING, under the style of Thomas Ryder and Co., Manchester, brewers, engineers and cooper-smiths.
JAMES SINCLAIR AND SON, Southwark-street, Southwark, London, and at Liverpool, manufacturers of and dealers in soap and other articles.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

F. ASHE Carnaby-street, Soho, London, oil and colourman.
TOM MARSDEN (trading as John Marsden and Sons), Wyke, near Bradford, manufacturing chemist and logwood cutter.

First Meetings, and Public Examinations.

J. HUNTER WATTS, Seething-lane, London, E.C., colour manufacturer and merchant, January 22, Bankruptcy Buildings, Portugal-street, Lincoln's-inn-Fields, London, February 11, 34, Lincoln's-Inn-Fields.
TOM MARSDEN (trading as John Marsden and Sons), Wyke, near Bradford, manufacturing chemist and logwood cutter, January 20, Official Receiver's Chambers, Bradford, February 7, County Court, Bradford.

Adjudications.

TOM MARSDEN (trading as John Marsden and Sons), Wyke, near Bradford, manufacturing chemist and logwood cutter.

Application for Debtor's Discharge.

E. WINDERBANK, Manchester, paper merchant, February 5, Court House, Manchester.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Pumps for Medical and Surgical Laboratories. C. Breuillard. 20,879. December 28.
Elements for Voltaic Batteries. D. G. Fitzgerald and A. H. Hough. 20,856. December 28.
Manufacture of Nitrate of Ammonia and Bicarbonate of Soda in conjunction therewith. Watson Smith and C. G. Cresswell. 20,862. Dec. 30.
Apparatus for Recovering Chemical from Solutions. M. B. Mason, S. D. Warren, and F. Warren. 20,908. December 31.
Battery Plates for Storage Batteries.—(Complete Specification). A. E. Woolf. 20,911. December 31.
Apparatus for generating and maintaining Electric Currents of Constant Quantity in Circuits of Varying Resistance. W. P. Thompson. 20,918. December 31.
Exposing Liquids to the Action of Gases. J. E. Bedford. 20,925. Dec. 31.
Apparatus for Distilling, Evaporating, or Concentrating Liquids. J. Wright. 20,954. December 31.
Dynamo-Electric Machines. J. J. Wood. 20,955. December 31.
A System of Hydro-Electric Distribution. F. Rysseberghe. 20,974. December 31.
Process of and Apparatus for Manufacturing Gas. H. E. Newton. 20,980. December 31.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Dec. 20th.

Antimony Ore—

Austria, 5 t. Bailey & Leatham
Sydney, 7 Saddington & Co.
Japan, 20 H. R. Merton & Co.
Bastia, 258 H. Emanuel
124 Johnson, Matthey & Co.
Portugal, 18 H. Emanuel
Spain, 40 B. Kuhn
Austria, 40 H. R. Merton & Co.

Alkali—

France, 102 c. Arnati & Harrison

Acetate of Lime—

U.S., £120 Johnson & Hooper

Bones—

U.S., 31 t. 10 c. H. A. Lane & Co.
E. Indies, 240 t. Cornwell, Son & Co.
Holland, 10 J. Lucey & Sons

Bone Meal—

E. Indies, 100 t. F. A. Hodgkinson & Co.

Barytes—

Holland, 23 cks. W. Harrison & Co.
Germany, 35 O'Hara & Hoar
Belgium, 154 "

Holland, 39 Purrell & Co
Germany, 46 W. Harrison & Co.
" 80 D. Storer & Sons
" 17 O'Hara & Hoar

Chemicals (otherwise undescribed)

Germany, £13 T. H. Lee
" 260 A. & M. Zimmermann
Holland, 190 Webb, Warter & Co.
Germany, 93 T. H. Lee
" 582 A. & M. Zimmermann
" 20 L. & I. D. Jt. Com.

Cream Tartar—

Holland, 7 pkgs. Middleton & Co.
Spain, 3 Webb, Warter & Co.
Italy, 64 Howards & Son
" 5 C. F. Gerhardt

Cochineal—

Spain, 2 Evans, Lescher & Co.
" 10 Webb, Warter & Co.
France, 52 W. C. Bacon & Co.
Holland, 14 J. Thornton
Spain, 9 C. Christopherson & Co.
Italy, 10 Webb, Warter & Co.

Caustic Soda—

Holland, 80 c. Beresford & Co.

Caoutchouc—

E. Indies, 62 c. Jackson & Till
Madagascar, 21 Kebbel, Sons & Co.
E. Indies, 58 Kleinwort, Sons & Co.

Straits Settlements, T. Merry & Sons
E. Africa, 19 Lewis & Peat
" 20 Kebbel, Son & Co.

France, 26

E. Indies, 44 Wallace Bros.

" 13 L. & I. D. Jt. Com.

Copperas—

Germany, £45 Charles & Fox

Camphor—

Germany, 27 pkgs. L. & I. D. Jt. Co.

Caustic Potash—

France, 13 pkgs. F. W. Berks & Co.

Cobalt Ore—

New Caledonia, 7t. Gellatly & Co.

Dyestuffs—

Cochineal

Canaries, 4 pkgs. Swanston & Co.

" 4 Beriro & Co.

" 8 Kuhner, Hendschel, & Co.

Alizarine

Holland, 60 pkgs. Union Lighterage Co.

Cutch

E. Indies, 500 pkgs. Hoare, Wilson & Co.

Tanners' Bark

Belgium, 11 t. J. Graves

" 19 10 c. Schlosser Bros.

Germany, 25 10 Hicks, Nash & Co.
Belgium, 8 10 Schlosser Bros.

Indigo

E. Indies, 74 chts. T. Ronaldson & Co.

" 36 L. & I. D. Jt. Co.

" 10 Parsons & Keith

" 62 T. H. Allan & Co.

" 32 L. & I. D. Jt. Co.

" 2 Benecke, Souchay, & Co.

" 169 Arbutnot, Latham & Co.

" 3 Parsons & Keith

" 68 L. & I. D. Jt. Co.

" 14 W. Brandt, Sons, & Co.

Sumac

Italy, 100 pkgs. F. Roberts

Extracts

Austria, 41 pkgs. L. J. Levinstein & Sons

" 500 A. J. Humphery

Canada, 840 "

U.S., 250 T. Ronaldson & Co.

France, 103 Burt, Boulton, & Co.

Denmark, 1 G. Scrutton & Co.

France, 103 Burt, Boulton, & Co.

" 180 L. J. Levinstein & Sons

U.S., 40 W. A. Bowditch

" 100 McCracken & Co.

Valonia

A. Turkey, 33 t. A. J. Humphery

Saffron	Ceylon, 189	Prop. Chamb. Whf.
Spain, 1 pkg.	" 42	Hoare, Wilson & Co.
" 1	" 14	Phillips & Graves
" 1	" 14	Phillips & Graves
Gambler	Holland, 230	A. & M. Zimmermann
E. Indies, 321 pkgs.	" 110	F. J. Putz & Co.
" 367	" 110	F. J. Putz & Co.
" 664	" 110	F. J. Putz & Co.
" 381	" 110	F. J. Putz & Co.
Myrabolams	Spain, 1,932 t.	C. Tennant, Sons & Co.
E. Indies, 998 pkgs.	" 110	F. J. Putz & Co.
Orchella	" 110	F. J. Putz & Co.
E. Indies, 21	" 110	F. J. Putz & Co.
Annatto	" 110	F. J. Putz & Co.
Ceylon, 7 pkgs.	" 110	F. J. Putz & Co.
" 42	" 110	F. J. Putz & Co.
" 14	" 110	F. J. Putz & Co.
Glycerine	" 110	F. J. Putz & Co.
Germany, 117	" 110	F. J. Putz & Co.
Holland, 520	" 110	F. J. Putz & Co.
Germany, 879	" 110	F. J. Putz & Co.
" 30	" 110	F. J. Putz & Co.
Gutta Percha	" 110	F. J. Putz & Co.
Germany, 1 t. 10 c.	" 110	F. J. Putz & Co.
E. Indies, 660 c.	" 110	F. J. Putz & Co.
" 610	" 110	F. J. Putz & Co.
B. W. I., 40	" 110	F. J. Putz & Co.
E. I., 80	" 110	F. J. Putz & Co.
" 179	" 110	F. J. Putz & Co.
Glucose	" 110	F. J. Putz & Co.
U. S., 1,300 pkgs.	" 110	F. J. Putz & Co.
Germany, 32	" 110	F. J. Putz & Co.
" 24	" 110	F. J. Putz & Co.
Sweden, 25	" 110	F. J. Putz & Co.
Germany, 340	" 110	F. J. Putz & Co.
" 100	" 110	F. J. Putz & Co.
" 100	" 110	F. J. Putz & Co.
" 12	" 110	F. J. Putz & Co.
" 200	" 110	F. J. Putz & Co.
" 100	" 110	F. J. Putz & Co.
" 25	" 110	F. J. Putz & Co.
" 25	" 110	F. J. Putz & Co.
France, 200	" 110	F. J. Putz & Co.
Germany, 50	" 110	F. J. Putz & Co.
" 100	" 110	F. J. Putz & Co.
" 200	" 110	F. J. Putz & Co.
" 25	" 110	F. J. Putz & Co.
France, 29	" 110	F. J. Putz & Co.
Isinglass	" 110	F. J. Putz & Co.
E. Indies, 12 pkgs.	" 110	F. J. Putz & Co.
" 11	" 110	F. J. Putz & Co.
" 16	" 110	F. J. Putz & Co.
Menthol	" 110	F. J. Putz & Co.
Germany, 130	" 110	F. J. Putz & Co.
Manure	" 110	F. J. Putz & Co.
Phosphate Rock	" 110	F. J. Putz & Co.
France, 150 t.	" 110	F. J. Putz & Co.
" 121	" 110	F. J. Putz & Co.
" 500	" 110	F. J. Putz & Co.
Belgium, 140	" 110	F. J. Putz & Co.
" 174	" 110	F. J. Putz & Co.
Manure (otherwise undescribed)	" 110	F. J. Putz & Co.
Germany, 32 t.	" 110	F. J. Putz & Co.
U. S., 4 15 c.	" 110	F. J. Putz & Co.
Belgium, 1	" 110	F. J. Putz & Co.
Manganese Ore	" 110	F. J. Putz & Co.
Estimot, 70 t.	" 110	F. J. Putz & Co.
Naphtha	" 110	F. J. Putz & Co.
Belgium, 10 brls.	" 110	F. J. Putz & Co.
Germany, 7	" 110	F. J. Putz & Co.
Potassium Sulphate	" 110	F. J. Putz & Co.
Germany, 10 pkgs.	" 110	F. J. Putz & Co.
Potassium Oxymuriate	" 110	F. J. Putz & Co.
Belgium, 100 pkgs.	" 110	F. J. Putz & Co.
Potassium Carbonate	" 110	F. J. Putz & Co.
France, 14 pkgs.	" 110	F. J. Putz & Co.
Germany, 4	" 110	F. J. Putz & Co.
Paraffin Wax	" 110	F. J. Putz & Co.
U. S., 12 brls.	" 110	F. J. Putz & Co.
Pitch	" 110	F. J. Putz & Co.
Germany, 30 brls.	" 110	F. J. Putz & Co.
Plumbago	" 110	F. J. Putz & Co.
Ceylon, 102 cks.	" 110	F. J. Putz & Co.
" 50	" 110	F. J. Putz & Co.
" 830	" 110	F. J. Putz & Co.
Germany, 4	" 110	F. J. Putz & Co.

Ceylon, 189	Prop. Chamb. Whf.
" 42	Hoare, Wilson & Co.
Phosphoric Acid	" 14
Germany, 14 pkgs.	Phillips & Graves
Potassium Bicarbonate	" 20
Holland, 230	A. & M. Zimmermann
Potash Salts	" 110
Germany, 110	F. J. Putz & Co.
Pyrites	" 110
Spain, 1,932 t.	C. Tennant, Sons & Co.
Saltpetre	" 110
Germany, 35 cks.	P. Hecker & Co.
E. Indies, 562 bgs.	G. Ward & Sons
" 703	L. & I. D. Jt. Com.
Germany, 3 cks.	Craven & Co.
E. Indies, 694 bgs.	Henckell & Co.
" 367	L. & I. D. Jt. Co.
Tartaric Acid	" 110
Holland, 2 pkgs.	Middleton & Co.
" 17	Webb, Warner, & Co.
Tar	" 110
Bilbao, 554 brls.	Burt, Boulton & Co.
Ultramarine	" 110
Holland, 10 cs.	W. Harrison & Co.
" 22 pkgs.	Haefner, Hilpert & Co.
" 20 cks.	Seaward Bros.
Zinc Oxide	" 110
Holland, 100 cks.	Props. Dowgate
Germany, 50 brls.	Julius Matton

LIVERPOOL.

Week ending Jan. 1st.

Albumen	Antwerp, 4 cs.
Bone Meal	Bombay, 916 bgs.
Bones	Glasgow, 211 bgs.
"	Cadiz, 627
Bone Ash	Rio Grande, 315 t.
Caoutchouc	New York, 3 brls.
"	Philadelphia, 50 pkgs.
"	New York, 4 cs.
Manaos	16
"	50
"	670
Saltpond	1 brl. 2 bxs.
"	1 hd. 3 brls. 2 cs.
"	1 cs.
"	1 brl.
Cape Coast Castle	2 brls.
Axim	2 bgs.
Grand Bassa	1 brl.
Sierra Leone	2
Bathurst	5
"	5 cks.
"	4
Chemicals (otherwise undescribed)	" 1
Rouen, 85 cks.	Co-op. W'sale Society, Ltd.
Copper Ore	" 1
Lisbon, a quantity.	Harrington & Co.
" 215 t.	"
Sestri Levante, 1,030 t.	H. Bath & Sons
Camphor	Rouen, 6 cks.
Cream Tartar	Barcelona, 5 cks.
Tarragona, 5	"
" 26	"
Copper Precipitate	" 1
Huelva, 148 t.	"
Charcoal	St. Nazaire, 726 sks.
Dyestuffs	" 1
Myrabolams	Bombay, 346 bgs.
" 333	"
" 400	"
Hamburg, 1 brl.	"
Indigo	" 1
Calcutta, 48 cts.	"

Argols	Oporto, 23 cks.
" 23	"
Sumac	Venice, 50 bgs.
Saffron	Valencia, 2 cks. 1 bg.
Cutch	Rangoon, 1,300 bxs.
Guano	Huanillos, 972 t.
"	Norman & Pigott
Glucose	Rouen, 5 cks.
"	Co-op. W'sale Society, Ltd.
" 57	"
Glycerine	Marseilles, 7 brls.
"	R. J. Francis & Co.
Hypophosphite	Rouen, 1 cs.
"	R. J. Francis & Co.
Horn Piths	Rio Grande, 5 t.
Isinglass	Para, 16 pkgs.
"	W. Hooton & Yates
Manganese Ore	Gothenburg, 120 t.
"	Macqueen Bros.
Nitrate	Iquique, 620 t.
"	N. Waterhouse & Sons
Oxalic Acid	Rotterdam, 60 cks.
"	O. & H. Marcus
Potash	Portland, 15 brls.
"	Rouen, 21 dms. 83 cks.
Phosphate	Ghent, 1,000 bgs.
"	Antwerp, 200 t.
Pitch	Rotterdam, 24 cks.
Pyrites	Huelva, 1,350 t.
"	Matheson & Co.
" 1,221	Tennants & Co.
Potash Salts	Hamburg, 1,827 bgs.
Paraffin Wax	Rangoon, 188 bxs.
Salt	Calcutta, 1 bg.
Sulphur Ore	Huelva, 1,430 t.
" 1,118	"
" 1,492	"
Sugar of Lead	Rouen, 87 cks.
"	R. J. Francis & Co.
Stearine	Antwerp, 1 bg.
Sulphur	Catania, 582 bgs.
"	67 brls.
Soda	Hamburg, 15 cks.
Saltpetre	Hamburg, 174 cks.
Tartaric Acid	Rotterdam, 28 cks.
Tar	Marseilles, 144 brls.
Ultramarine	Rotterdam, 10 cks.
Waste Salt	Hamburg, 200 t.
Zinc Oxide	Rotterdam, 5 cks.
"	Antwerp, 5 brls.
" 183	"
Zinc Ashes	Hamburg, 10
Boston, 9 brls.	"

HULL.

Week ending Jan. 2nd.

Aluminium	Rotterdam, 41 cks.
"	W. & C. L. Ringrose
Ammonia	Rotterdam, 14 cks.
"	W. & C. L. Ringrose
"	Wilson, Sons & Co.
Acetic Acid	Rotterdam, 30 chys.
"	Geo. Lawson & Sons
Barytes	Bremen, 5 cks.
"	Veltmann & Co.
" 12	J. & T. Seddon
Antwerp, 100 bgs.	Bailey & Leatham
Chemicals (otherwise undescribed)	" 1
Bremen, 2 cs. 2 cks.	Veltmann & Co.

Dunkirk, 72 pkgs.	Wilson, Sons & Co.
" 16 cks.	"
Antwerp, 39 13 drms.	"
Hamburg, 90	"
Dyestuffs	"
Alizarine	Rotterdam, 24 pkgs.
"	W. & C. L. Ringrose
" 133 cks.	Hutchinson & Son
" 87 pkgs.	W. & C. L. Ringrose
" 13 cks.	Hutchinson & Son
" 27	W. & C. L. Ringrose
" 1	"
Madder	Rotterdam, 4 cks.
"	J. Pye-Smith & Co.
" 4	Geo. Lawson & Sons
" 5	Wilson, Sons & Co.
Extracts	Dunkirk, 20 cks.
"	Wilson, Sons & Co.
Rouen, 108	Rawson & Robinson
Dextrine	Hamburg, 100 bgs.
"	Wilson, Sons & Co.
Glucose	Hamburg, 10 cks.
"	Rawson & Robinson
" 15	Woodhouse & Co.
" 400 bgs.	C. M. Lofthouse & Co.
Stettin, 24 cks.	Wilson, Sons & Co.
Hamburg, 28	"
" 12	Bailey & Leatham
" 50	"
Glycerine	Amsterdam, 9 pkgs.
Manure	Danzig, 4 cks.
"	Ghent, 240 t.
" 100	Wilson, Sons & Co.
" 344	"
Naphthol	Rotterdam, 5 brls.
"	Hutchinson & Son
Pitch	Ghent, 97 cks.
"	Wilson, Sons & Co.
Pyrites	Huelva, 1,437 t.
"	J. Dalton, Holmes & Co.
Potash	Rotterdam, 3 cks.
"	Geo. Lawson & Sons
Plumbago	Hamburg, 19 cks.
"	Wilson, Sons & Co.
" 9	Furley & Co.
Soda	Rotterdam, 43 cks.
"	G. Lawson & Sons
Stearine	Antwerp, 3 bgs.
"	Bailey & Leatham
Tartaric Acid	Rotterdam, 7 cks.
"	W. & C. L. Ringrose
Turpentine	Libau, 50 brls.
"	Konigsberg, 40
Waste Salt	Hamburg, a quantity.
"	Geo. Lawson & Sons

GLASGOW.

Week ending Jan. 2nd.

Alum	Rotterdam, 40 cks.
Barytes	Rotterdam, 46 cks.
Chemicals (otherwise undescribed)	Rouen, 12 pkgs.
"	J. & P. Hutchison
Carbon	New York, 15 cs.
Copper Ore	Huelva, 1,222 t.
"	Thariss Co.
Dyestuffs	"
Sumac	Rouen, 100 bgs.
"	J. & P. Hutchison
Alizarine	Rotterdam, 58 cks. 2 cs.
Pitch	Antwerp, 9 cks.
Stearine	Antwerp, 13 bgs.
"	New York, 20 lbs.
"	Baltimore, 20
Sodium Nitrate	Pisagua, 1,413 t.
"	A. Cross & Sons
Sulphur Ore	Drontheim, 155 t.
Tartar	Bordeaux, 8 cks.
Tartaric Acid	Rotterdam, 3 cks.
"	J. Rankine & Sons

TYNE.	
<i>Week ending January 1st.</i>	
Earth—	
Hamburg, 18 cks.	Tyne S.S. Co.
er Precipitate—	
Iva, 419 t.	
icals (otherwise undescribed)	
Hamburg, 1 cs.	Tyne S.S. Co.
se—	
erdam, 20 bgs.	Tyne S.S. Co.
Hamburg, 45 cks.	"
rine—	
Hamburg, 11 cs. 3 cbys.	Tyne S.S. Co.
um—	
en, 150 t.	
es—	
Iva, 1 321 t.	
etre—	
Hamburg, 250 t. Clephans & Wiencke	

Ultramarine—	
Rotterdam, 1 ck.	Tyne S.S. Co.
Waste Salt—	
Hamburg, 50 t.	Tyne S.S. Co.
GRIMSBY.	
<i>Week ending December 28th.</i>	
Albumen—	
Antwerp, 13 pkgs.	
" 7 cks.	
Chemicals (otherwise undescribed)	
Hamburg, 24 cks.	
Extract of Tan—	
Dieppe, 20 pkgs.	
Glucose—	
Hamburg, 12 cks.	
" 40	
" 12	
Zinc Ashes—	
Antwerp, 24 pkgs.	

GOOLE.	
<i>Week ending December 25th.</i>	
Antimony Ore—	
Boulogne, 9 cks.	
Charcoal—	
Antwerp, 75 bgs.	
Copper Ore—	
Huelva, 660 tons	
Dyestuffs—	
Alizarine	
Rotterdam, 34 cks.	
Dyestuffs (otherwise undescribed)	
Boulogne, 30 cks.	
" 46 cs.	
Glucose—	
Dunkirk, 120 bgs.	
Hamburg, 21 cks.	
" 161 bgs.	
Calais, 200	

Glycerine—	
Hamburg, 3 cs.	
Plumbago—	
Boulogne, 7 pkgs.	
" 8 cks.	
" 6 cs.	
Potash—	
Calais, 19 pkgs.	
" 69 drms.	
Antwerp, 16 cks.	
Dunkirk, 35	
Sodium Chlorate—	
Rouen, 3 cks.	
Saltpetre—	
Hamburg, 43 cks.	
Rotterdam, 100 bgs.	
" 270	
Tartaric Acid—	
Dunkirk, 120 bgs.	
Rotterdam, 1 ck.	
Waste Salt—	
Hamburg, 35 cks.	

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.
Week ending December 28th.

gine (otherwise undescribed)	
gine, 300 btles.	£457
—	
nica, 6 t.	£47
onia—	
shama, 5 cwt.	£11
io, 25 cs.	£17
onia Sulphate—	
Hamburg, 341 t. 19 cwt.	£4 127
inique, 202 10	2,500
onia Carbonate—	
gine, 1 t. 2 cwt.	£29
eaux, 1 2	33
ington, 5 cs.	12
o Acid—	
shama, 4 cwt.	£11
ey, 8 cs	27
phite of Lime—	
to, 1 t. 13 cwt.	£23
stone—	
il, 3 t. 10 cwt.	£27
K—	
Hamburg, 1 t. 1 cwt.	£60
n Tartar—	
ourne, 3 t. 5 cwt. 28 pkgs.	£480
ey, 1 t.	£114
eras—	
ador, 10 t. 14 cwt.	£27
o Acid—	
gine, 4 cks.	£147
Hamburg, 1 t. 13 c. 1 ck.	254
io, 3 cwt.	23
lle, 18 cwt.	131
ourne, 15 cwt.	105
il, 2 t. 10 cwt.	326
ey, 10	75
sels, 12	95
er Sulphate—	
stchurch, 1 t. 10 cwt.	£33
ey, 2	47
olic Acid—	
Town, 16 cwt.	£43
ogne, 4 t. 14 cwt.	£173
seilles, 15	1,680
icals (otherwise undescribed)	
cland, 27 cs.	£191
York, 11 pkgs.	106
tic Potash—	
ier, 5 t. 5 cwt.	£102
fectants—	
ey, 20 cks.	£33
Hamburg, 25	100
ourne, 42 cs.	43
io—	
ritius, 2,119 bgs. 172 cks.	£1,000
Carbon—	
sels, 3 t. 15 cwt.	£68
ire—	
Hamburg, 152 t. 7 cwt.	£595
Hamburg, 50	400

Jersey, 152 12	1,492
Guernsey, 6 10	41
Antwerp, 50 3	350
Launceston, 5	54
Hobart, 15	162
Oxalic Acid—	
Dunkirk, 8 t. 5 cwt.	£270
Potassium Bichromate—	
M. Video, 10 cwt.	£23
Phosphorus—	
Wellington, 19 cs. 4 1/2 cwt.	£162
Otago, 18 1,000 lbs.	£266
Phosphoric Acid—	
Berbice, 5 t. 14 cwt.	£88
Saltpetre—	
Oporto, 11 t. 1 cwt.	227
Lisbon, 40 15	867
Sydney, 2 10	55
Santos, 7 16	174
N. Orleans, 25	545
Adelaide, 1 5	27
Saccharum Cake—	
Dunkirk, 50 t.	£75
Sulphuric Acid—	
Natal, 1 t. 15 cwt.	£9
Kurrachee, 6 3	60
Sheep Dip—	
Pt. Howard, 300 cs.	£600
Melbourne, 41 pt.	52
Natal, 6 t. 3 cwt.	280
Sodium Sulphate—	
Lyttelton, 18 cks.	£30
Tartaric Acid—	
Melbourne, 95 kegs.	£764
Sydney, 54	174

LIVERPOOL.*Week ending Dec. 28th.*

Alkali—	
Antwerp, 10 cks.	
Genoa, 30	
Ammonia Carbonate—	
Oporto, 5 c.	£8
Ammonia Muriate—	
Philadelphia, 32 t. 3 c. 39.	£736
San Francisco, 1	17
Antimony Regulus—	
Portland, M., 1 t.	£74
Rotterdam, 3	213
Antwerp, 10 c.	33
Alum—	
Bombay, 82 t. 19 c.	£386
Seville, 1	5
Syria, 9 19 1 q.	50
Oporto, 1 4	7
Sydney, 1	5
Constantinople, 2 t. 9 c. 1 q.	12
Smyrna, 3	15
Ammonia Sulphate—	
Boston, 2 t. 4 c. 1 q.	£15
Demerara, 33 3	431
Ammonia—	
Monte Video, 5 c.	£14

Bleaching Powder—	
Amsterdam, 7 cks.	
Batoum, 26	
Boston, 639	
" 10 kgs. 257 tcs. 303 cks.	
Genoa, 45 cks.	
Ghent, 141	
Hamburg, 54	
Havana, 8	
Malaga, 4 brls.	
Messina, 35	
Naples, 4	
New York, 191	
" 78 t. 8 cks.	£428
Oporto, 30 brls.	
Palermo, 7	
Passages, 42 cks.	
Rouen, 130	
Santos, 4 cs.	
Trieste, 29	
Venice, 54	
Vera Cruz, 25	
Borax—	
Rouen, 42 t. 15 c.	£1,232
Borate of Lime—	
Havre, 50 t. 19 c. 1 q.	£612
Caustic Soda—	
Algiers, 35 bxs.	
Amsterdam, 183 dms.	
Antwerp, 44 10 brls.	
Baltimore, 100	
Barcelona, 100	
Barbadoes, 120	
Batoum, 200	
Beyrout, 25	
Bombay, 15	
Bordeaux, 8	
Boston, 500	
Calcutta, 30	
Carthage, 75 25 cks 5 brls.	
Catania, 115	
Cienfuegos, 10	
Constantinople, 25	
Genoa, 55	
Ghent, 5	
Guantanamo, 10	
Hamburg, 35	
Halifax, 25	
Havana, 40	
Hiogo, 200	
Lisbon, 20	
Messina, 30	
Maceio, 30	
Manilla, 100	
Malaga, 256 126 kgs. 10 brls.	
Maracaibo, 10	
Malta, 5	
Matanzas, 50	
Nantes, 192	
New Orleans, 200	
Naples, 650	
New York, 668	
Odessa, 98	
Oporto, 89	
Passages, 169	
Pernambuco, 10	
Philadelphia, 135 brls.	
Port Natal, 22 cs.	

Portland, M. 400 dms.	
" O. 20	
Rotterdam, 40	
Rouen, 161	
Rio Janeiro, 15	
Santo Domingo, 40 kgs.	
Santander, 12	
Seville, 45	
Shanghai, 80	
Sydney, 46	
Tampico, 300 kgs.	
Talcahuano, 40	
Tarragona, 113 30 cks.	
Tacoma, 50	
Trebizonde, 7	
Valencia, 25	
Vera Cruz, 15	
Yokohama, 300	
Chemicals (otherwise undescribed)	
Bahia, 7 pkgs.	£50
Antwerp, 16 t. 18 c.	514
Hamburg, 1 14 2 q.	85
New York, 10	30
Copper Sulphate—	
Bilbao, 5 t.	£115
Passages, 10	218
Rouen, 11 12 c.	136
Barcelona, 10 1 q.	180
Bordeaux, 10 3	220
Venice, 20 2	294
B. Ayres, 40 kgs.	47
Constantinople, 6 c.	6
Carbolic Acid—	
Santander, 6 c. 3 q.	£27
New York, 2 t.	112
Paris, 1 5 2	146
Hamburg, 1 10	192
Amsterdam, 17 2	12
Caustic Potash—	
Tuticorin, 19 c.	£21
Melbourne, 3 t. 2	62
Calcutta, 2 7	47
Charcoal—	
Nantes, 14 t.	£70
Copperas—	
Syria, 2 t. 13 c.	£6
Calcium Chloride—	
B. Ayres, 5 t.	£10
Disinfectants—	
Bombay, 3 c. 3 q.	£7
Epsom Salts—	
Rio Janeiro, 100 kgs.	
Glycerine—	
Portland, 10 t. 13 c.	£446
Iron Oxide—	
Boca, 179 t. 9 c. 2 q.	£449
Barcelona, 15 2	70
Rosario, 20 t.	59
Lime Carbonate—	
Lisbon, 1 t. 14 c.	£9
Magnesia—	
Trieste, 1 cs.	

Manure—	
Peking, 57 t. 1 c. 2 q.	£399
Demerara, 150 t.	1,340
itch—	
Catania, 60 cks.	
Marseilles, 2,350 t.	
New York, 54 cks.	
Potassium Prussiate—	
Oporto, 4 c.	£16
Potassium Nitrate—	
Demerara, 3 t. 14 c.	£35
Potassium Bichromate—	
Genoa, 11 t. 2 c.	£290
Monte Video, 6	12
Calcutta, 1	41
Potassium Chlorate—	
Genoa, 8 c. 2 q.	£10
Hio, 15 t.	330
New York, 10 t.	484
Hamburg, 13 c.	27
Ghent, 1 t.	179
Gothenburg, 4 t.	33
Leghorn, 12 c.	51
Odessa, 1 t.	102
Antwerp, 2	39
Rotterdam, 17 c.	198
Shanghai, 3 t. 12	
Potashes—	
Catania, 4 t. 12 c.	£92
Rio de Janeiro, 2	5
B. Ayres, 2 t. 13	53
Phosphate—	
Hamburg, 31 t. 16 c.	£301
Potassium Carbonate—	
Calcutta, 13 c.	£12
Picric Crystals—	
Hamburg, 6 t. 7 c. 3 q.	£1,075
Salt—	
Algoa Bay, 5 t.	
Amsterdam, 200	
Anamaboe, 19	
Astoria, 86	
Antwerp, 190	
" 267	
Buenos Ayres, 198	13 c.
Baltimore, 50	
Barbadoes, 21	10
Bibundi, 30	
Bony, 9	
Boston, 280	
Cameroon, 153	10
Calcutta, 3,637	
Cape Town, 26	15 c.
Cape Coast, 5	
Chicago, 130	
Chittagong, 2,152	
Ghent, 379	
Iquique, 1	3
Isles de Los, 49	17
Mauritius, 352	2
Para, 71	
Rotterdam, 150	
" 233	
Santheds, 3,005	
Sierra Leone, 70	
Valparaiso, 2	15
" 105 cs.	
" 30	
Sodium Bicarbonate	
Antwerp, 303 pkgs. 10 cks.	
Amsterdam, 20 kgs.	
Barcelona, 200	
Constantinople, 40	8
Hamburg, 15	
Honolulu, 10	
Hankow, 30	
Hatifa, 109	
Nagasaki, 20	
Rotterdam, 245	20 brls.
Rangoon, 31	
Rouen, 90	
Seville, 80	10
Valencia, 50	
Yokohama, 1,250	
Soda Ash—	
Albin, 10 brls.	
Baltimore, 199 cks. 466 tcs.	
Barcelona, 111 brls.	
Bombay, 29 tcs.	
Bordeaux, 174 cks. 168 tcs. 536 bgs	
Catania, 10	
Constantinople, 42	200 brls.
Cuba, 30	
Ghent, 44	
Leghorn, 42	
Monte Video, 10	
Melbourne, 295	
Naples, 8	
New York, 122	1,196 tcs.
New Glasgow, 46 tcs.	
Oporto, 20 cks.	
Portland, O., 26 cks.	
Philadelphia, 261 tcs. 190 sks.	
Rosario, 50 cks.	

Rangoon, 9 brls.	
Rio Janeiro, 10 cks.	
Syria, 250 brls.	
Smyrna, 75 cks.	
Valparaiso, 100 brls.	
Yokohama, 120	
Sodium Silicate—	
Bilbao, 58 brls. 16 cks.	
Beyrout, 5	30
Barcelona, 30	
Constantinople, 10	5
Mollendo, 32 cks.	
Oporto, 32 cks.	
Soda Crystals—	
Bombay, 400 kgs.	
Hoston, 280 brls.	
Constantinople, 180	
Calcutta, 35	
New York, 438 cks.	
Portland, O., 300	
San Francisco, 360 brls.	
Tacoma, 434	
Valparaiso, 30	100 dms.
Sodium Bichromate—	
Sydney, 120 kgs.	
Sheep Dip—	
Algoa Bay, 2 c. 2 q.	£5
Buenos Ayres, 90 t. 3 c. 2 q.	2,085
Sodium Sulphate—	
Seville, 18 c.	£5
Salammoniac—	
Syria, 4 c.	£7
Constantinople, 2 t. 5	70
Naples, 18	31
Kurrachee, 1	49
Genoa, 6	11
Pernambuco, 1	5
Bilbao, 8	13
Sodium Nitrate—	
Demerara, 19 t. 19 c.	£197
Portland, 1	7
New York, 1	3 q.
Batoum, 1	8
Seville, 1	5
Fiume, 6	2
Sulphur—	
Guantanamo, 12 c.	£5
Batoum, 1 t. 15	39
Halifax, 7	12
Tampico, 10	1
Vera Cruz, 1	6
Iquique, 41	17
Boston, 67	2
Saltcake—	
New York, 49 t. 10 c.	£95
Superphosphate—	
Hamburg, 100 t. 1 c. 1 q.	£112
Tar—	
Bay Beach, 10 brls.	
Cerra Azul, 8	
New York, 8	
Guayaquil, 50	
Tartaric Acid—	
Montreal, 2 t. 6 c.	£351
Waste Salt—	
Opobo, 731 t.	
Portland, 99	
Port Townsend, 115	
Portland, O., 885	
Port Natal, 28	
Rangoon, 1,928	
Salt Pond, 7	17 c.
Savannah, 500	
Seattle, 250	
Sierra Leone, 40	
Talcahuano, 44	10
Tacoma, 400	
Zinc Chloride—	
New York, 4 t.	£68

GLASGOW.

Week ending January 2nd.

Ammonia Sulphate—	
Valencia, 1	£1,083
Ammonia—	
Hamburg, 10 t.	£116
Bleaching Powder—	
Karachi, 2 t. 8 c.	£23
Rotterdam, 58 pns.	£690
Copperas—	
Karachi, 79 t. 1 c.	£212
Chemicals (otherwise undescribed)	
Karachi, 5 t. 10 c.	£74
Charcoal—	
Hamburg, 462 bgs. 41 t. 12 c.	£190
Epsom Salts—	
Sydney, 3 t. 2 c.	£24
Litharge—	
Karachi, 1 t. 10 c.	£26

Manure—	
Valencia, 165 t. 14 c.	£1,308
Manganese—	
Rotterdam, 18 cks.	£88
Potassium Bichromate—	
Karachi, 3 t. 1 c.	£109
Pitch—	
Antwerp, 640 t.	
Paraffin Wax—	
Bilbao, 5 t. 12 c.	£80
Sheep Dip—	
Melbourne, 6 t. 10 c.	£200
Sulphuric Acid—	
Karachi, 15 t. 10 c.	£77
Sodium Bichromate—	
Karachi, 1 t.	£26
Sugar of Lead—	
Karachi, 4 t. 8 c.	£78
Soda Ash—	
Baltimore, 31 t. 15 c.	£390
Tar Oil—	
Bilbao, 10 t.	£40

TYNE.

Week ending Jan. 1st.

Alkali—	
Christiania, 1 t. 2 c.	
Gothenburg, 5	8
Leghorn, 29	7
Antwerp, 5	2
Rotterdam, 1	1
Alum Cake—	
Copenhagen, 7 t. 9 c.	
Bandholm, 6	2
Arsenic—	
Genoa, 1 t. 15 c.	
Antimony—	
Rotterdam, 2 t.	
Rouen, 6	
Ammonia Sulphate—	
Genoa, 30 t.	
Helsingborg, 30 t. 9 c.	
Hamburg, 15	
Bleaching Powder—	
Hamburg, 13 t. 10 c.	
Lisbon, 8	
Gothenburg, 14	8
Christiania, 19	
Copenhagen, 2	4
Rotterdam, 17	17
Rouen, 54	2
Antwerp, 100	3
Barytes Carbonate—	
Antwerp, 9 t. 18 c.	
Rouen, 57	
Barytes—	
Rouen, 35 t.	
Caustic Soda—	
Lisbon, 1 t. 19 c.	
Genoa, 18	15
Antwerp, 170	1
Dunkirk, 17	
Syria, 110	6
Copperas—	
Christiania, 3 t. 1 c.	
Odense, 5	7
Glauber Salts—	
Christiania, 1 t. 7 c.	
Litharge—	
Genoa, 1 t. 2 c.	
Rouen, 7	17
Magnesia—	
Antwerp, 6 c.	
Barcelona, 5 t. 16	
Rouen, 11	
Nitrate of Baryta—	
Rouen, 5 t. 3 c.	
Potassium Chlorate—	
Genoa, 1 t.	
Leghorn, 1	12 c.
Naples, 10	
Antwerp, 2	
Copenhagen, 5	
Malmö, 2	10
Pitch—	
Leghorn, 200 t.	
Antwerp, 100	
Valencia, 25	
Soda Ash—	
Lisbon, 12 t. 9 c.	
Gothenburg, 6	11
Dunkirk, 6	10
Copenhagen, 19	5
Genoa, 3	1
Leghorn, 2	3
Soda—	
Nykjobing, 21 t. 14 c.	
Christiania, 5	6

Malmö, 11 t. 17 c.	
Genoa, 11	12
Catania, 2	
Huelva, 2	3
Horsens, 13	17
Odense, 28	7
Antwerp, 6	9
" 5	7
Syria, 19	19
Nakskov, 19	17
Rotterdam, 23	6
Sodium Bicarbonate—	
Christiania, 1 c.	
HULL.	
Week ending December 31st.	
Alum—	
Gothenburg, 670 slbs.	
Alkali—	
Riga, 255 cks.	
Borax—	
Danzig, 26 cks.	
Bone Size—	
Harlingen, 1 ck.	
Bleaching Powder—	
Stettin, 110 cks.	
Chemicals (otherwise undescribed)	
Antwerp, 1 cs. 39 cks	
Amsterdam, 7	20
Alexandria, 12	
Bergen, 1	
Bremen, 6	
Bordeaux, 36	
Christiania, 16	15 drms.
Copenhagen, 13	200 pkgs.
Danzig, 24	88
Dunkirk, 44	
Gothenburg, 6	13
Hamburg, 234	35
Konigsberg, 4	10
Libau, 1	
New York, 100	88
Rotterdam, 30	125
Rouen, 9	
Stavanger, 7	
Stettin, 15	123
Caustic Soda—	
Danzig, 86 drms.	
Libau, 35	
Riga, 363	
Dyestuffs (otherwise undescribed)	
Hamburg, 1 cs.	
Reval, 20 cks.	
Rotterdam, 4	
Manure—	
Gothenburg, 10 cks.	
Hamburg, 1055 bgs.	
St. Michael's, 5 t.	
Pitch—	
Antwerp, 342 t.	
Slag—	
Amsterdam, 155 t.	
Danzig, 407	
GOOLE.	
Week ending Dec. 25th.	
Benzol—	
Antwerp, 26 cks.	
Rotterdam, 118	
Terneuzen, 32 drs.	
Chemicals (otherwise undescribed)	
Antwerp, 20 cs.	
Ghent, 10 cks.	
Rotterdam, 25	
Coal Products—	
Dunkirk, 45 cks.	
Dyestuffs (otherwise undescribed)	
Boulogne, 1 cs.	
" 2 cks.	
Ghent, 20	
Manure—	
Boulogne, 24 bgs.	
Ghent, 680	
Pitch—	
Antwerp, 650 tons	
Dunkirk, 56	
GRIMSBY.	
Week ending Dec. 28th.	
Chemicals (otherwise undescribed)	
Dieppe, 34 cks.	
Hamburg, 8 pkgs.	
Rotterdam, 24 drms.	
Coal Products—	
Dieppe, 10 cks.	
Dyestuffs (otherwise undescribed)	
Dieppe, 1 ck.	

THURSDAY, JANUARY 16, 1890.

the values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary

	£	s.	d.
Lime, Acetate (brown)	8	5	0
" " (grey)	14	0	0
Magnesium (ribbon and wire)	per oz.	0	2 3
" Chloride (ex ship)	per ton	2	7 6
" Carbonate	per cwt.	1	17 6
" Hydrate	"	0	10 0
" Sulphate (Epsom Salts)	per ton	2	15 0
Manganese, Sulphate	"	18	0 0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
" Ore, 70 %	per ton	4	5 0
Methylated Spirit, 61° O.P.	per gallon	0	2 2
Naphtha (Wood), Solvent	"	0	3 6
" " Miscible, 60° O.P.	"	0	4 0
Oils :—			
Cotton-seed	per ton	22	10 0
Linseed	"	22	10 0
Lubricating, Scotch, 890°—895°	"	7	5 0
Petroleum, Russian	per gallon	0	0 5 3/4
" American	"	0	0 6 3/4
Potassium (metal)	per oz.	0	3 10 0
" Bichromate	per lb.	0	0 4
" Carbonate, 90% (ex ship)	per ton	18	5 0
" Chlorate	per lb.	0	0 4 3/4
" Cyanide, 98%	"	0	2 0
" Hydrate (Caustic Potash) 80/85 %	per ton	23	0 0
" " (Caustic Potash) 75/80 %	"	21	15 0
" " (Caustic Potash) 70/75 %	"	20	15 0
" Nitrate (refined)	per cwt.	1	3 6
" Permanganate	"	4	5 0
" Prussiate Yellow	per lb.	0	0 9 3/4
" Sulphate, 90 %	per ton	9	10 0
" Muriate, 80 %	"	7	15 0
Silver (metal)	per oz.	0	3 8 3/4
" Nitrate	"	0	2 5 1/2
Sodium (metal)	per lb.	0	4 0
" Carb. (refined Soda-ash) 48 %	per ton	5	5 0
" " (Caustic Soda-ash) 48 %	"	4	2 6
" " (Carb. Soda-ash) 48 %	"	4	15 0
" " (Carb. Soda-ash) 58 %	"	5	12 6
" " (Soda Crystals)	"	2	12 0
" Acetate (ex-ship)	"	16	0 0
" Arseniate, 45 %	"	10	0 0
" Chlorate	per lb.	0	0 6 3/4
" Borate (Borax)	nett, per ton.	29	10 0
" Bichromate	per lb.	0	0 3
" Hydrate (77 % Caustic Soda)	per ton.	8	15 0
" " (74 % Caustic Soda)	"	8	5 0
" " (70 % Caustic Soda)	"	7	17 6
" " (60 % Caustic Soda, white)	"	6	17 6
" " (60 % Caustic Soda, cream)	"	6	10 0
" Bicarbonate	"	5	0 0
" Hyposulphite	"	5	0 0
" Manganate, 25%	"	8	10 0
" Nitrate (95 % ex-ship Liverpool)	per cwt.	0	8 3
" Nitrite, 98 %	per ton	27	10 0
" Phosphate	"	15	0 0
" Prussiate	per lb.	0	0 7
" Silicate (glass)	per ton	5	7 6
" " (liquid, 100° Tw.)	"	3	17 6
" Stannate, 40 %	per cwt.	2	0 0
" Sulphate (Salt-cake)	per ton.	1	6 0
" " (Glauber's Salts)	"	1	10 0
" Sulphide	"	7	15 0
" Sulphite	"	5	5 0
Strontium Hydrate, 98 %	"	8	0 0
Sulphocyanide Ammonium, 95 %	per lb.	0	0 7 3/4
" Barium, 95 %	"	0	0 5 1/2
" Potassium	"	0	0 7 1/4
Sulphur (Flowers)	per ton.	7	0 0
" (Roll Brimstone)	"	6	0 0
" Brimstone : Best Quality	"	4	15 0
Superphosphate of Lime (26 %)	"	2	10 0
Tallow	"	25	10 0
Tin (English Ingots)	"	99	0 0
" Crystals	per lb.	0	0 6 3/4
Zinc (Spelter)	per ton.	24	10 0
" Chloride (solution, 96° Tw.	"	6	0 0

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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FOREIGN LABOUR IN THE AMERICAN GLASS TRADE.

THE American glass trade is going through an experience which, though by no means peculiar, is yet replete with interest to those who study the intricate relations subsisting between labour and capital in the trades and manufactures. The Glass Workers' Association, with a view to keeping up rates of wages, and otherwise protecting the interests of its members, has used its power, after a very arbitrary fashion, to limit apprentices to a number out of all proportion to the requirements of a growing trade. The laws of supply and demand—mightier than any Glass Workers' Association—were not to be interfered with, and the American workmen have now the mortification of seeing foreigners making their way in to fill positions which an over-strained policy has withheld from their own countrymen. Nor is their vexation likely to be diminished by the fact that the invocation of the alien contract labour law promises to be of little avail to them.

We are far from being devoid of sympathy for the American, as for all other working men, but we cannot help dwelling on this as another of the many cases where an uncurbed militant trade unionism defeats its own ends, and ruins the best interests of those who combine to give it their practical advocacy. A trades union is a labour syndicate, and trades unionists too often fail to realise the fact that the foundations of all syndicates are exceedingly unstable. The experience of the great copper gamble—so recently gone to take its place among the great failures of the past—was not needed to teach us that moderation is the first element of success in any syndicate or combination. Exaggerated demands and one-sided restrictions always tend, directly or indirectly, to compass the downfall of the undertaking in which their sway is too freely allowed. Had the American glass workers taken care to put, so to say, their own house in order first, and secured their position by a more liberal regulation of their own numbers, so that they could at any time have dealt with the demands of an increased trade, then things would have been better for them. The result of their dog-in-the-manger policy may be a reduction, through increased competition, in the rates of wages that they have been seeking to raise. We hope the lesson will act as a warning to our own countrymen. It is quite evident to all that our national welfare for the next few years, at least, will depend very largely upon the position taken up by the working man as represented in the trades unions. If these bodies act wisely and study the true interests of their members, we see no reason to anticipate the decadence of England's greatness, but if, on the other hand, the working man allows himself to be robbed of his sound common sense by the blatant mob orator or the irresponsible sower of agitation, and blocks the course of trade and industry because he is unable to obtain his not always reasonable demands, then, for himself and his country, we fear the time may be a disastrous one, and may see such a deviation of our trade to other quarters that our industrial pre-eminence will cease to be

recognised, and our commercial prestige irretrievably lost. We repeat, with emphasis, that in our opinion, almost everything depends upon the moderation displayed by employers and employed in their mutual relations, and we trust that both parties may have so profited by past experience, that no serious check may be given to the flow of our industrial enterprise. It is a repetition of the old story of the "Belly and the Members." The prosperity of the one cannot be permanently dissociated from that of the other. In the long run they must stand or fall together.

Legal.

IMPORTANT ACTION AGAINST A STYAL FARMER.

CHESHIRE FARMERS AND A MANCHESTER MANURE COMPANY.

AT the Altrincham County Court, on the 8th inst., before his Honour Judge Ffoulkes, the Manchester Phosphate Company sued John Walton, a farmer, of Styal, near Altrincham, for the sum of £6. 0s. 9d., for manures sold and delivered. Mr. Sutton, barrister, (instructed by Messrs. Addleshaw and Warburton, of Manchester), appeared for the company, and Mr. Gray, of Stockport, defended.

Mr. Sutton, in stating the case, said when this manure was sold to the defendant no complaints were made about it; and all Mr. Smith, the company's agent, had said was that he had sold it previously at a higher price; but when the bill was applied for he said there was no fertilising power in the manure. He mentioned the case at Stockport which had been taken against the company, and the result of the analysis there was that there were no fertilising ingredients at all in the manure; and his Honour gave judgment for defendant. This surprised the company.

His Honour said the issue was for the defendant.

Mr. Sutton thought it well that he should mention this.

Mr. Gray submitted that his case did not rest solely upon the manure; here were direct misrepresentations made at the selling of this manure. It would be more convenient for the plaintiffs' witnesses to be called first.

His Honour held that defendant's witnesses should be called first.

Mr. Gray, continuing, said this was not a case which affected the defendant alone, but a large class of men in Cheshire. For about a year a man in the employ of the company had been going about selling to the farmers a certain manure as being phosphate manure, and stating that it was bone phosphate—made of blood and bones. This agent had said that his employers had been obliged to get rid of this stuff because of the offensive smell, and that it caused a fever, and also that he had sold some of the same kind to Mr. Rogerson and Mr. Booth, both well-known farmers in the neighbourhood, and that that they had done great things with it. He went on puffing this manure up, and the result was defendant eventually bought three tons. The stuff was invoiced at £6 0s. 9d., including 10s. 6d. for bags, and defendant wrote back stating that it was to be bags free, which the plaintiffs denied. About two or three days afterwards defendant opened the bags and saw nothing but very large lumps. He put this stuff on two halves of a meadow field, and left the other half bare in order to test it; and he found it had no good effect on the land. Samples of the manure were sent to Mr. Thomson, a well-known analyst in Manchester, and he would tell them that instead of containing 14% of phosphate of lime, as plaintiffs guaranteed in their letter, it only contained 3.19, and it was such a small quantity that it was practically worthless. He then called

The defendant, who stated that on the 12th November he took a sample of this manure to Manchester, out of the three or four bags which were left unused. He delivered the sample to a lad named Garner, who took it to the Royal Institution, and who further took it to someone in the laboratory.—Cross-examined: He took it from three different bags which had not been used at all.

James Garner, clerk to Messrs. Brown and Ainsworth, solicitors, Stockport, proved taking the sample.

Mr. William Thomson said he was a member of the firm of Crace, Calvert, and Thomson, Manchester, and that in November, he received a sample of manure for analysis from his assistant, Mr. Hart. He examined the contents of the bag, and found it contained phosphoric acid equal to tribasic phosphate of lime of 3.93 per cent. Manures were estimated for their fertilising worth by the quantity of tribasic phosphate of lime or their equivalent. One of the chief constituents of this manure was plaster of Paris, and, assuming that it was in its best condition, it would be worthless to throw on the land. The manure in this condition was of no value; and there was just as much

chance of it doing harm as good if put on the land. Cross-examined: Any manure which contained Prussian blue would injure plant life. The manure might contain some appreciable amount of bone, but no blood. The sample he had produced was practically not soluble; theoretically it was, but it might take 20, 30, or 50 years.

The defendant, recalled, stated that in April of last year a man named Smith called at his house and said he had a manure to offer him which would be of very great advantage. He described the manure as made from blood and bone, suitable for present crops, as meadows, grass, and oats, and that it was soluble. He said the price was £3 per ton, but owing to a fever breaking out near to the works, he was offering it at 35s. per ton, carriage and bags free. Smith (the agent) had told him that he had sold some to Mr. Rogerson, of Handforth Hall, and also to Mr. Booth, of Dairy House Farm, Handforth. Defendant knew these gentlemen as being practical farmers, and he gave the agent an order for three tons. When the manure arrived, he found the bulk was in hard, dry lumps. He had the manure put on two halves of meadow and also on some oats, in most favourable weather. After it had been on the fields some ten or twelve days they had to pick some of it off again, as it was not soluble. When they came to cut the grass they found the lumps, and it was with great difficulty that they cut the grass, as the manure got in the knives; and in consequence they had to cut it higher. He afterwards wrote to the company complaining of the quality of the manure.—Cross-examined: The reason he took it off the land was because the lumps would not break. One of the representations made by the agent Smith, was that it would grow clover up to the waist.

Evidence was then called by the plaintiff company.

John Heaton, manager to the company, gave evidence as to what the manure was composed of, and also spoke as to taking a sample to Mr. Estcourt. Cross-examined, he said a great many farmers had refused to pay since an action was taken at Stockport.

George Smith, agent to the company, said the manure produced was not a fair sample. He remembered calling on the defendant and sending a sample to him. They usually carried samples about with them, but he could not say whether he had one on this occasion. Defendant asked him if he had been selling anything in the neighbourhood, and he replied that he had been selling some fish and bone manure to others in the district. He did not tell defendant it was blood and bone manure. He admitted that he wrote to Mr. Rogerson, of Handforth Hall, stating that he was selling bone phosphate at 35s. per ton, and asking him to speak well of it. Since the case at Stockport a great many of the Cheshire farmers had refused to pay.

Samuel Arnold, clerk to the company, said defendant called at the company's office, and offered to pay for the manure, less the price of the bags.

Mr. C. Estcourt, analyst to the city of Manchester, said he had analysed the sample of manure sent him, and found it was of a reasonable merchantable value. Cross-examined: He could not agree with Mr. Thomson that it was worthless.

His Honour, in summing up, said the only point left for him to determine was whether what was sold to the defendant was worthless as a marketable commercial commodity; if it had any value in it at all the defence failed. The defendant took what was offered him believing that he would get value in the manure, but when he finds out that he does not get the advantages he expected the proper course for defendant to pursue would have been to have charged the plaintiff company with the amount of the labour involved in order to get the article into a proper condition. This case was one which ought to be decided upon scientific evidence which was very good on both sides. Mr. Thomson had given his evidence for the defendant in an extremely able manner, but in cross-examination he admitted that there were things in this manure of fertilising properties, and also that there might be something else in it which neutralised the effect. The evidence went to prove that it was not worthless. He felt sorry that defendant did not get the benefits he expected from it, but if he had allowed it to stop in the ground it might have been better. He should give judgment for the plaintiffs with costs.—The case lasted about five hours, and there was a good deal of interest taken in it by farmers.

A NEW RED DYE.

THE Clayton Aniline Co., Limited, are introducing a new red, patented and manufactured by them under the name of *Stanley Red for Silk*.

This red is a new azo colour, and possesses several advantages for silk dyeing over the azo colours now employed; it does not bleed by lying in water, is fast to acids and alkalis, fairly fast to light and soap and does not mark off by warm pressing between white paper.

The ungummed silk (hanks or pieces) is dyed in a bath acidulated with sulphuric acid ($\frac{1}{4}$ to $\frac{1}{2}$ lb. for 10 lbs. silk) with or without the addition of boiled off liquor.

For 10 lbs. silk use 27 gallons of water.

2½ to 3 " " boiled off liquor,

and a sufficient quantity of sulphuric acid to render the bath slightly acid; then add a solution of 4 to 6ozs. of Stanley red in water, enter the silk and raise the temperature slowly up to 170 degs.—190 degs. F., work for $\frac{1}{2}$ to $\frac{3}{4}$ hour, wash in water, wring off and brighten in a weak solution of either acetic acid or tartaric acid ($1\frac{1}{2}$ —3ozs. for 30 gallons of water), wring off and dry. Stanley red can be dyed in the same bath with every acid colour, and is suitable for mixed goods of wool and silk, as it dyes equally well with sulphuric acid or with a mixture of sulphuric acid and Glauber's salt.

EXTRACTS FROM BOARD OF TRADE JOURNAL.

DISCOVERY OF SPONGES ON THE SICILIAN COAST.

The *Perseveranza* of Milan states that important sponge-banks have lately been discovered close to the island of Lampedusa, on the southern coast of Sicily. These deposits of sponges extend for over a surface of from 15 to 18 marine leagues, and are situated about an equal distance from the south-eastern extremity of the island. The smallest depths above these banks is 20 ells; the greatest depth is from 30 to 31 ells. At the lesser depths rock is met with, on which the sponge grows; at greater depths a sandy soil is found. All varieties of sponge are discovered here, including those which are in the greatest commercial request, and they are easy to obtain. Greek and Italian vessels have already proceeded to Lampedusa to take advantage of this discovery.

SULPHATE OF COPPER FOR VINEYARDS IN BARCELONA.

Her Majesty's Consul at Barcelona reports to the Secretary of State for Foreign Affairs that notices have been published in the *Official Gazette* of the Province by the "Provincial Deputation," signed by "E. Maluquer, President," to the effect that the deputation have decided to obtain in foreign markets, where it is manufactured, a quantity of pure sulphate of copper for distribution to vine growers in the province, whose vineyards are attacked by mildew.

Manufacturers are, therefore, invited to send samples with quotation of prices to the "Deputation" at Barcelona either direct or through their agent.

THE ITALIAN VINTAGE OF 1889.

"According to the returns furnished from the various wine-growing districts of Italy, early in September the grape crop was estimated to produce 22,308,366 hectolitres of wine, or 490,784,052 imperial gallons, being, 61·13 per cent. of an average yield. Storms, cold weather, excessive damp, and insect ravages have, however, done more serious damage to the vines than had been expected, and according to the reports received by the Ministry of Agriculture, the actual production of wine in Italy this year has been limited to 21,139,100 hectolitres, or 465,060,200 imperial gallons, being only 57·77 per cent. of an average yield.

"In no part of Italy has the crop approached an average, and it has been excessively light in Venetia, in Lombardy, in Piedmont, and in Liguria. The quality of the wine is stated to be $\frac{1}{2}$ th excellent, $\frac{1}{4}$ th good, $\frac{1}{4}$ th moderate, and $\frac{1}{4}$ th inferior."

TRADE BETWEEN SPAIN AND THE UNITED KINGDOM.

I.—IMPORTS INTO THE UNITED KINGDOM FROM SPAIN.

Principal Articles.		Quantity.		Value.	
		Three Months ended December.		Three Months ended December.	
		1888.	1889.	1888.	1889.
Chemical products, unenumerated	Value	—	—	£ 12,811	£ 12,364
Copper, ore and regulus	Tons	25,528	19,327	573,974	424,201
" unwrought and	"	5	—	3 00	—
" manufactured	"	84	357	1,952	3,546
Cork, unmanufactured ..	Lbs.	164,018	292,350	11,210	20,582
" manufactured	Tons	615,476	890,693	414,268	659,932
Iron Ore	"	596	10	3,374	90
Lead, ore	"	20,868	20,881	285,552	274,097
" pig and sheet	"	1,840	3,004	5,520	7,423
Manganese ore	"	34	1,483	1,151	51,186
Oil, olive	Tons	136,588	120,050	282,582	223,235
Pyrites of iron or copper ..	Tons	403,784	412,631	50,669	43,561
Quicksilver	Lbs.	12,723	16,316	78,346	95,967
Rags, esparto	Tons	—	—	62,129	50,284
Silver ore	Value	—	—	228,538	252,864
Wine	Galls.	1,023,110	1,152,654	7,790	34,474
Wool, sheep and lambs' ..	Lbs.	282,262	1,027,430	—	—
Zinc ore	Tons	220	—	560	—

2.—EXPORTS OF BRITISH AND IRISH PR KINGDOM TO SPAIN

Principal Articles.		Quantity.		Value.	
		Three Months ended December.		Three Months ended December.	
		1888.	1889.	1888.	1889.
Alkali	Cwts.	76,910	—	—	—
Bags and sacks, empty ..	Dozs.	7,788	—	—	—
Caoutchouc, manufac- tures of	Value	—	—	—	—
Cement	Tons	2,715	—	—	—
Chemical products and preparations (including dye stuffs)	Value	—	—	—	—
Clay, and manufactures of	"	—	—	—	—
Coals, cinders and fuel ..	Tons	360,160	3	—	—
Coal, products of, &c., including naphtha, paraffine, paraffine oil, and petroleum	Value	—	—	—	—
Cotton yarn	Lbs.	81,100	—	—	—
Cottons, entered by the yard	Yards	660,300	94	—	—
Cottons, entered at value	Value	—	—	—	—
Glass manufactures	"	—	—	—	—
Grease, tallow, and animal fat	Cwts.	4,671	3	—	—
Hardware and cutlery, unenumerated	Value	—	—	—	—
Implements and tools ..	"	—	—	—	—
Jute yarn	Lbs.	953,800	2,176	—	—
Linen yarn	"	963,000	990	—	—
Linens, entered by the yard	Yards	268,400	305	—	—
Linens, entered at value.	Value	—	—	—	—
Machinery, steam engines	"	—	—	—	—
" all other sorts ..	"	—	—	—	—
Manure	"	—	—	—	—
Metals, iron, wrought and unwrought	Tons	15,347	18	—	—
Metals, brass, manufac- tures of	Cwts.	380	1	—	—
Metals, copper, wrought and unwrought	"	717	7	—	—
Metals, tin, unwrought ..	"	747	1,4	—	—
Oil, seed	Tons	67	1	—	—
Oil, other sorts	Value	—	—	—	—
Oil and floorcloth	Sq. yds	76,500	67,6	—	—
Painters' colours and materials	Value	—	—	—	—
Paper of all sorts	Cwts.	748	1,6	—	—
Provisions (including meat)	Value	—	—	—	—
Silk manufactures	"	—	—	—	—
Soap	Cwts.	679	4	—	—
Telegraphic wires and apparatus	Value	—	—	—	—
Wood, hewn and sawn, and manufactures of ..	"	—	—	—	—
Wool, foreign, dressed in the United Kingdom ..	Lbs.	47,900	164,80	—	—
Wool, flecks and rag wool	"	6,600	14,20	—	—
Woollens, entered by the yard	Yards	216,500	479,10	—	—
Woollens, entered at value	Value	—	—	—	—

CUSTOMS TARIFF OF NICARAGUA

The following is a statement of the rates of im on the articles specified under the Customs tariff duty in each case is leviable per Spanish *libra* or pound avoirdupois are equal to 101·6 Spanish pou

Note.—Peso 4s. 2d. (nominal val

ARTICLES.

MEDICINES, DRUGS, &c.

Oils, olive, linseed, almond, castor, cocoa-nut, coc any other similar oils

Acids, chlorhydric, muriatic, sulphuric, and nitric Do. carbolic, acetic, and oxalic

	Pes. Cts.
rpentine oil, gaseous mineral oil, acidulated waters.....	0'02
ua-fortis, orange and rose water.....	0'05
u de Cologne, lavender, Florida, holy, Kananga, and other similar toilette waters.....	0'07
hite lead or carbonate of lead.....	0'04
um.....	0'02
quid ammonia or volatile alkali.....	0'04
een copperas or sulphate of iron.....	0'01
lphur of any kind.....	0'03
gar candy.....	0'08
carbonate of soda.....	0'01
rax or borate of sodium.....	0'05
ernary bandages of any kinds.....	0'20
xes of wood or cardboard for the use of chemists.....	0'02
arbonate of soda crystallised and chloride of lime.....	0'01
edicinal sweetmeats or pastiles.....	0'15
orks for stoppers of bottles and casks.....	0'10
edicinal barks.....	0'15
alk, clay, Tripoli.....	0'02
ases of glass and articles of any kind for chemists and druggists.....	0'05
rtificial teeth and dental mastic.....	0'50
erfumed and medicinal essences.....	1'00
ponges of any kind.....	1'00
iquid amber.....	0'05
um arabic or gum lac.....	0'10
lycerine.....	0'08
int.....	0'15
enna leaves and rosemary.....	0'06
oaps and syrups, medicinal.....	0'15
yringes, syphons, and any other articles of caoutchouc and gutta-percha.....	0'30
o., and any other articles of metal, except gold and silver ..	0'10
o., and any other articles of glass.....	0'05
inseed or linseed flour.....	0'03
ocoa butter.....	0'15
at for ointments or pomades.....	0'05
edicines in gelatine capsules, patented medicines, as well as balms and mixtures of oils in drugs, pastes, powders, in a liquid state, tragacanth, and medicines in any form and prepared in any way not specially mentioned.....	0'15
edicines and drugs, in pastes, powders, liquids, tragacanth in any form, and prepared in any way, not specially mentioned.....	0'15
Mustard, in seed or flour.....	0'08
all nuts.....	0'05
artificial eyes of any material.....	0'13
xide of zinc.....	0'04
ltering paper.....	0'05
itch, resinous.....	0'02
ill makers' and other utensils, and instruments of metal for chemists and druggists.....	0'15
Epson and Glauber Salts.....	0'02
altpetre, or nitrate of potash.....	0'03
alammoniac.....	0'05
caustic soda.....	0'02
edicinal berries.....	0'15
ulphate of iron.....	0'01
ulphate of zinc, or white vitriol.....	0'02
ulphate of copper, or blue vitriol.....	0'03
ulphate of quinine.....	1'00
Persian sherbet.....	0'05
suspenders, waistbands, bandages, and similar articles ..	0'20
affetas, cerecloth, &c.....	0'25
urpentine.....	0'05
utensils for chemists and druggists, of fatence, stone, and composition, such as mortars, basins, &c.....	0'03
Poisons for tanning, insects, &c.....	0'10
edicinal wines, such as quinine, extract of meat, &c.....	0'15
aseline, casmoline, and petrolate.....	0'10
Bristol sarsaparilla and other similar kinds.....	0'08

The following Articles pay specific duties as under :—

Articles.	Rates of Duty.
Foreign Spirits more than 12 degrees up to 25 degrees inclusive by the Cartier alcoholmeter..	Bottle Pes. Cts. 0'40
Do., more than 25 degrees by the Cartier alcohol- meter (with special authority of the Govern- ment) pay same duty as the preceding articles with an increase per degree in excess of ..	0'03
Tobacco, in rolls or snuff ..	Spanish } Pound } 0'40

The following Articles are free from import duty :—

Manure for agricultural use.	Lime and cement.
Still, under special authority from the Government,	Tubing of iron, galvanised or not, and the corresponding plugs.
Metallic fencing wire, with posts, rails, and other accessories.	Coal and animal charcoal.
Stone breakers.	Crucibles for melting metals.
Mercury for mines.	Ice.
Asphalt.	Gold in lumps, bars, dust, or coined.
Sorting and ventilating machines for coffees and seeds.	Silver in lumps, bars, dust, or coined.
Water pumps of metal of any kind.	Fire bricks and tiles for smelting furnaces.
Hydraulic pumps of metal of any kind.	Hydraulic presses.

Articles not mentioned in the tariff pay the duties leviable on similar articles; those not mentioned in the composition of which there are several materials pay the duty leviable on the chief material; finally, for those not mentioned which cannot be classified, there is levied 50 per cent. on the invoice value. If the original invoice is missing a valuation of the goods will be made by experts.

The import duties are fixed on the gross weight without any deduction for cases and packages.

THE COPPER TRADE IN 1889.

MESSRS. James Lewis and Son, in their review of the Copper Trade for 1889, write :—Whereas the year 1888 will be memorable in the history of the copper trade for the rise of the French syndicate formed to control all the supplies of this metal, the year 1889 will be still more memorable for its fall. The original conception of this speculation contained elements of success, but the manner in which its details were carried out doomed it to failure. The level of prices at which contracts were made with the different producing companies, varying from £61. 10s. to £70. per ton, was far too high, as there is little doubt that most of them would at one time have gladly contracted for their production at about £50. per ton—a price that would have left a fair profit not only to the mining companies, but also to the syndicate themselves, without materially contracting the consumption. Moreover, very much less capital would have been required by the syndicate, the want of which was the primary cause of its collapse. Had the syndicate been able to finance their large stock a little longer, and met consumers by a moderate reduction in price, they would have obtained the benefit of the exhaustion of all outside stocks, and of the great revival in the metal trade generally which sprang up shortly after their downfall, and have thus enabled them to dispose of part of their holding. Moreover, American producers were willing to accept a reduction on their contract prices, and were on their way to France to arrange the details at the time of the collapse of the syndicate, and the English mining companies would probably have followed their example. The effect of the syndicate's operations, extending over a period of one year and five months, was an increase in the stocks of copper in public and private warehouses in England, France, and the United States—from the minimum reached on the 31st December, 1887, of 58,000 tons, to the maximum attained on the 1st May, 1889, of 179,000 tons—of 121,000 tons, about one-half of which was due to increased supplies and the other half to diminished consumption. During this period the value of copper advanced from £40. on the 21st October, 1887, to £107. on the 9th September, 1888, and receded to £35. per ton on the 18th March, 1889. The statistics show that the direct import of copper into England and France in 1889 was 14,077 tons less than in 1888; that, exclusive of the Chili bars transferred from England to France, the export of copper from England exceeded that of 1888 by 26,118 tons; and that the apparent consumption of England was 23,197 tons greater than in 1885, while the apparent consumption of France was 3,338 tons less. The figures with regard to France are, however, misleading, in consequence of the large quantity of English copper shipped to France in 1888 and not returned in the public stocks, chief portion of which appeared to have gone into consumption in 1888, whereas it has really been consumed during 1889. Taking the average English and French consumption and the English export for the two past years, 123,640 tons, it is 2,700 tons per annum less than that of the previous two years, nearly 11,000 tons less than that of the years 1885 and 1884, and nearly 7,000 tons per annum less than the average of the four years 1884 to 1887. It is, therefore, evident that the large deliveries of the past nine months have hardly made good the great depletion of stocks all over the world, without in any way supplying the greatly increased demand due to the present revival in trade, and to the special demand arising from the extended use of electricity and of sulphate of copper. The value of telegraphic wires and apparatus exported in 1889 was £1,040,082. against £521,055. in 1888, or more than double, as the cost of the copper used in 1888 was higher than in 1889, and the value of machinery and mill-work ex-

ported in 1889 was £15,254,658. against £12,939,267. in 1888 ; in this case, however, the value of the iron used was greater in 1889 than in 1888. The consumption of the United States has exceeded that of 1888 by 27,500 tons. The impetus given to production by the high prices paid by the syndicate increased the import into England and France from 117,000 tons in 1887 to 160,000 tons in 1888, but during the past year it has fallen to 146,000 tons under the influence of the low prices which followed the collapse of the syndicate. The most notable decrease has been in the shipments from Chili, 8,500 tons, and from "other countries" nearly 8,000 tons, while from the United States it is 500 tons, from Australia 500 tons, and from Japan nearly 2,000 tons. The increase from Spain and Portugal is, however, 1,500 tons, from the Cape of Good Hope 2,700 tons, from Quebrada 700 tons, and from Mexico 1,800 tons. The total production of the world for the past year we estimate at 263,000 tons, against 260,000 tons in 1888. During 1889 the public stocks in England and France decreased 1,319 tons, and private stocks in France and elsewhere have been very largely reduced, while in the United States they have decreased 5,800 tons—the total reduction during the year being probably over 25,000 tons. On the 1st January, 1889, the total stock was probably 150,000 tons; by the 1st of April it had increased to about 175,000 tons; and we now estimate it at about 125,000 tons. The quantity of copper produced during 1890 will mainly depend upon the level at which the value is maintained. At £50. for good merchantable copper there is little doubt that most, if not all, of the large producers can work to a fair profit, while this price will in no way interfere with consumption. This latter promises to be very large with the great extension of the use of electric light and power, the increasing demand for sulphate of copper, the brass required for the numerous war and other steamships in course of construction, and the locomotives and machinery for which makers are full of orders up to nearly the end of the year. The production of the United States is estimated as follows (tons fine) :—

	1885.	1886.	1887.	1888.	*1889.
Lake Superior	32,209	35,593	33,331	38,574	38,300
Arizona	10,137	6,990	8,036	14,195	14,300
Montana	30,267	25,720	35,223	43,704	46,900
Other States and Territories	1,439	1,507	2,517	4,194	6,000
Total	74,052	69,810	79,107	100,667	105,500
Imported as Pyrites.....	2,271	2,009	2,367	2,192	2,200
Total	76,323	71,819	81,474	102,859	107,700
Stock, 31st December....	15,600	13,400	12,000	34,800	29,000
Estimated consumption ..	40,000	50,000	62,000	48,000	75,500
	*Estimated.				

THE GOVERNMENT AND THE TELEPHONE.

THE present position of the telephone question in this country is peculiar, and we are certain to see very considerable changes in connection with it during the year 1890. It will be recollected that when the telephone first came to be introduced—namely, in 1879 and 1880—it was thought that the new industry could be carried on independently of the Post Office telegraphic monopoly, and telephone exchanges in the principal cities of the kingdom were started upon that footing. At that time, also, the rival patents of Graham, Bell, and Edison were represented by separate organisations, and entered into competition with each other. The Post Office, however, quickly asserted its claim to control the use of the new invention wherever it was employed for the purpose of communicating between two persons, or, in fact, for any other purpose than upon the exclusively private affairs of one individual or firm. In the result it was held that the Department was entitled to take this ground, in virtue of the Telegraph Acts, and in consequence it was arranged to grant licences to the companies then in the field, empowering them to continue their business subject to certain restrictions, and in particular to a payment to the Department, by way of royalty, of 10 per cent. of the gross takings. These licences were granted as from the 1st January, 1881, and for a period of thirty-one years from that date, but it was a condition that the Postmaster-General might at certain intervals signify his intention to purchase the business of any company, the price to be paid being fixed by an arbitrator in the usual way. The first date upon which this option can be declared is 30th June, 1890; and, if exercised, the purchase would take effect as from the 31st December following. Should the Government elect not to buy at present, the next break in the licence will not occur until 1897. As between the companies themselves, competition soon became to be regarded as suicidal, and an amalgamation of the interests of Bell and Edison was arranged early, so that it was to a combination of these two groups that the

licences referred to were granted. The ir the so-called "receiver," or instrument wh hear the message; that of Edison to the "i into which the words are spoken. Each in for his invention. For instance, it was o Bell instrument was equally available for transmitting. But this was speedily foun able. Finally, there have been minor inver the efficiency of the original discoveries, in but the patents for these, also, are mainly e the National Telephone Company, now organisation in the kingdom. So much as dustry in its relation to the Post Office Dep of the business as presently founded upon of the instruments employed. These p approaching their expiry, when, of course, i construct exchanges free from the control o patent of Bell will terminate with the yea middle of 1891, and minor patents later, practically as soon as 1890 is out new and riv operations, and, as a matter of fact, a prop under discussion, to establish what are called somewhat on the lines of a club. It appear year one of two things may happen, either c plete change in the existing position as re Government elects to purchase, the telepho ment of the Post Office, and all future devel through that medium. If on the other hand, not to interfere, and is willing—as in such ci doubt be willing—to grant further licences, competition next year between the existing cerns which are certain to spring into exis into any discussion at present as to what t under either alternative, there will be a dec part of the public to lean to the view that to a and open competition to have full scope wil tension of use and a cheap service to the publi the interest of the Department, which has ex public money in acquiring the telegraph me sight of,—*Scotsman*.

**THE MANCHESTER ASSO
ENGINEERS.**

MR. John West, M.Inst.C.E., gave his pre the above association on the 11th inst, or two local matters, Mr. West went on to con of electric and gas lighting. There were ele formed for lighting London, with a united capi sterling, and these companies were now erec ting down steam boilers, engines, electrical pla., plying the various districts. Electricity was su companies on the following different systems, continuous current; (2) the direct continuous c and (3) the alternate current transformer system. the various systems were stated, after which Mr. with the question of the cost of the supply.

The charges for electricity ranged from 7d. to 1 unit of 1,000 watts, and some companies would supply a consumer under a minimum charge of £14 per annum. It was admitted that electricians had made some progress in machinery for securing a better and more regular light, but it must not be forgotten that improved lighting has advanced by very rapid strides. Having in 1882 dealt with the various types of incandescence burners, he pointed out that since that period incandescence burners have been perfected. These were the regenerative, Siemens, Sugg, Wenham, Fourness, and others, and the various types of Welsbach, Clamond, and others, both of which have come into general use, particularly the regenerative type, which gives them a better light than can be obtained with from any other quantity of gas. He had been favoured with many suggestions for experiments made by Mr. Alexander Smith, of Aberdeen, for the use of arc burners of suitable size for lighting halls, shops, &c., as follows:—

By consuming 10 cubic feet of gas per hour in oil light equal to 155·2 candles was obtained, or 15·5 cubic foot of gas consumed per hour. This result, gas, which, when tested according to the method of Work Clauses Act, gives a light equal to 5·6 cubic foot, thus showing a gain of 9·92 candles for every when used by these lamps, or a gain of over 177 per cent.

Similar tests have been made with London Gas Co. lamps, and Wenham and other regenerative lamps, which show

actory results. A photometric test of the Welsbach lamp made by Professor Carlton J. Lambert showed that an illuminating power of 18.8 candles was obtained with a consumption of three cubic feet per hour of London 18-candle gas. The relative cost of gas and electricity with equal light from each was then compared. Eminent electricians stated that a 16-candle-power incandescent lamp was calculated to last about 1,000 hours, and would absorb 60 Board of Trade units of electricity in that time. The cost of 60 units at 8d. per unit, the usual Board of Trade limit of charge, would be 40s., to which must be added 3s. 9d., the cost of the lamp, which made a total of 43s. 9d. per 60 units. To make the comparison clear as to the cost of gas in London, Manchester, and Aberdeen to produce the same amount of light, both with ordinary burners and regenerator burners Mr. West prepared the following table.

COMPARISON OF COST BETWEEN GAS AND ELECTRICITY.

THE ILLUMINATING POWER AND PRICE OF GAS PER 1,000 CUBIC FEET AS SUPPLIED IN LONDON, MANCHESTER, AND ABERDEEN.

ELECTRICITY.	One incandescent lamp of 16 candle-power requires 60 watts per hour, or 60 Board of Trade units every 1,000 hours, which at 8d. per unit (the price now charged by the House to House Electric Supply Co., Kensington, and the Electric Supply Co., Liverpool) amounts to 40s. od. To which must be added the cost of lamp, 3s. 9d.				Equivalent light in candles for one hour.	Comparative cost.	Ratio of cost, showing the number of times cheaper gas is than electricity.
					16,000	s. d. 43 9	1
WITH ORDINARY GAS BURNERS.	Quality of gas:	No of cubic feet required to produce 16 candle-power per hour.	No. of cubic feet required for 1,000 hours.	Price of gas.			
	cand-les	cubic feet	cubic feet	s. d.			
London	16	5	5,000	2 6	16,000	12 6	3.5
Manchester	20	4	4,000	2 6	16,000	10 0	4.4
Aberdeen	28	2.88	2,880	3 6	16,000	10 1	4.3
WITH REGENERATIVE BURNERS.							
London	16	2½	2,500	2 6	16,000	6 3	7
Manchester	20	2	2,000	2 6	16,000	5 0	8.7
Aberdeen	28	1.44	1,440	3 6	16,000	5 0½	8.7

The comparison is made with the best type of burners, as these are the reach of everyone, and the gas is compared with an electric lamp which is assumed to give the same light throughout the 1,000 hours, but such is not the case, as it is found, after they have been used for a time, that the carbon filaments get volatilised and deposited in the glass, consequently the size of the filament is diminished, and the surface of illumination reduced; the resistance of the filament would also be increased, and the intensity of the incandescence decreased for a given power, the carbon on the glass further reducing the light. These facts are confirmed by the experiments of Mr. W. I. Preece, chief electrician to the Post Office, who states that the ordinary commercial lamps consuming 3.54 watts per candle-power when new, require 6.1 watts per candle-power after burning 900 hours, the mean absorption being 5.25 per lamp. Stated the other way, it appears that the candle power of the lamps after burning 900 hours is only 58.5 per cent. of the initial duty, and the mean value of a lamp during its life is only 67 per cent. of that which it possesses when new. Assuming an average use of four hours per day for a lamp, this means not only that all incandescent lamps must be renewed before 25 days, when their luminosity is little more than half what it was when new; but taking all the lamps in an establishment together, three should be provided to do the work of two if the intended average lighting effect is to be maintained. The advantage of electric lighting in a low-pitched room where ventilation is defective was admitted, but this could be obtained with regenerative burners. Mr. West then went on to give his views as to the cheapest and best way of producing and delivering electricity to the consumer under varying circumstances. He was informed that in one town a complete electric lighting plant driven by steam power, and supplying from a central station 3,000 incandescent lamps of 16 candle-power, with cables laid long the streets, would cost about £20,000. Mr. Ferguson Bell, of

Stafford, stated that in their town it would cost £14,500. for a like installation, but he did not include the cost of land in his estimate, details of which were given.

If the number of lights was sufficient, there was the plan of a consumer providing himself with electric light by means of a complete plant, driven either by a gas engine or steam engine, on his own premises. A friend of his had given him the cost of a complete electric installation, including fittings for 320 incandescent lamps of 16 candle-power each, which had been working for about two years at one of the banks in London, and was driven by Crossley Bros.' gas engines. The plant included two 9-horse-power Otto engines, two dynamos, and two sets of accumulators, and cost £3,000. The working expenses—for 1,800 hours per annum, the building being dark—were, including interest on capital at 10 per cent., £1,012. 10s. per annum. The current supplied was equal to about 38,500 Board of Trade units. The analysis of the above figures shows that—

The cost for generating electricity, including wear and tear and d. interest on capital, is 5.58 per Board of Trade unit.
Interest on fittings '56 " "
Cost for renewal of lamps '7 " "

The total cost per Board of Trade unit on the complete installation 6.84 " "

From these figures it will be seen that if the bank had obtained electricity from a central station electric lighting company, at 8d. per unit, the total cost to them would have been:

d.
Electricity 8.0 per Board of Trade unit.
Interest on fittings '56 " "
Cost for renewal of lamps '7 " "
Total 9.26 " "

So that by generating electricity on their own premises they saved 2.42d. per unit, or £357. 19s. 2d. per annum. He thought it would be found in practice that the most economical and satisfactory way of producing and supplying electricity to the consumers would be by gas engines on their own premises, or by a system of very small central stations, where a few houses or shops were in close proximity and worked by the direct system of distribution. By this plan we would avoid expensive outlay on buildings, at the same time be advantageously using the existing gas mains, besides being able to dispense with the cost and maintenance of an electrical meter on the premises. The cost of generating plant for 400 incandescent 16 c.p. lamps on this plan would be as follows:—Plant, £900.; working expenses for 1,800 hours per annum, £660.; current supplied, 43,200 Board of Trade units; cost per unit, 3.66d. In the case of an installation of 50 lamps of the same power, the cost of plant would be £275.; the working expenses, £110. 19s. the current, 5,400 units; and the cost per unit, 4.93d.

By this plan electricity could be supplied, as shown by these examples, at prices varying from 3.66d. to 4.93d. per Board of Trade unit, according to the size of the installation, inclusive of working expenses, repairs, depreciation, and interest on capital. The usual charge by the London electrical companies, whose supply was generated for large districts in large stations driven by steam power, was 8d. per unit, showing a saving of 4.34d. and 3.07d. per unit respectively in favour of the gas engine scheme. To explain how the charge for working by gas was obtained, he took first the quantity of gas required per indicated horse-power per hour at 20 cubic feet; with this amount of gas a maximum of 8 lamps of 16 candle-power each could be maintained per hour, and by allowing a little extra for irregularities, and taking 50 cubic feet of gas to produce one Board of Trade unit, the gas would cost 1½d., to which must be added the other figures in the table of working expenses just given. The reason why electricity could be distributed to customers by gas engines cheaper than from a large central station, was because the very expensive cables for distributing the electricity (which in most cases take one-third of the capital employed) could be dispensed with, and the further expenses for renewal after they have been in use for a time. It was stated that Edison's cables in Berlin only lasted three years. These cables cost £90,000. for 36,000 lamps of 16 candle-power and 144 arc lamps. From these facts it was quite clear that the interest on the first cost and maintenance and renewals of distributing plant alone would be more than the cost of gas delivered on the consumers' premises from the existing mains. While approving of the action of the Corporation of Manchester in applying for a provisional order, he thought they should not put down a central station, but rather encourage separate installations in which gas engines would be used, Messrs. Crossley Brothers having sold 550 for this purpose. Gas engines and dynamos might be hired to consumers in the same way as stoves are. In many cases where arc lights of high power were employed on out-door work, they had been superseded by the "Lucifer" and

"Wells" patent portable lights, the latter being supplied with Wells oil or refined gas tar. This was a very cheap and useful light, 250 of them being in use on the Ship Canal. It must not be forgotten that in nearly all cases both gas and electric light were obtained from the energy contained in coal, and that gas companies and corporations who own gas works could produce as much light direct from the gas made from a ton of coal (if properly applied) as could be obtained from a ton of coal by any other means, besides having the resulting coke, tar, and ammoniacal liquor to dispose of. So, as far as he could judge, gas must remain by far the most economical of the two methods of lighting.

Dealing with the subject of "water gas," he said it had been brought very prominently before the public during the last year or two, more for the purpose of floating speculative companies, perhaps, than because of any real novelty; for at least 30 years had elapsed since it was new to English gas engineers, and many had been the trials of variations of the same principle, owing to the extreme simplicity of the apparatus and the large amount of work that could be done on a small area of land; but the question of ultimate economy had often prevented the success of schemes which otherwise were satisfactory. At the present moment he was referring more particularly to the use of water gas for general lighting purposes, as there were many examples in England of its admirable qualities as a heating agent for certain processes.

Mr. West then gave a brief description of the various methods of manufacturing water gas, and said that one great drawback to the process was the time spent in producing the necessary heat, and the large volume of producer gas of very poor quality thereby generated. In America, where the water gas system had reached its highest development, the gas was often produced from generators upon a large scale on the same works as ordinary coal gas. In some places in England, where water gas was used for heating, the producer gas was a great nuisance and source of loss. There was a great difference between the circumstances of the production of water gas as a lighting agent in America, and its production here; for in America the petroleum oil used to invest the gas with lighting properties was easily obtained at a very low price, and the price of coal gas was much higher than in England, so there was a greater margin between the two kinds than was the case here. As a heating agent water gas was very valuable where a very high flame temperature was desirable, as the theoretical temperature was about 5,000° F., while that of coal gas was about 2,500° F. In conclusion, Mr. West said that many ways had been tried to obtain illumination from water gas, but he thought it questionable whether there were any advantages to be gained. The comparisons instituted had been founded on actual experiment and experience, and in this way only was the truth to be arrived at.

EXPLOSION IN A GUNPOWDER MILL.

THE other evening a disastrous explosion occurred in the gunpowder mill owned by Messrs. Hay, Merricks, and Co., Limited, at Roslin, in the county of Midlothian, by which five men lost their lives, and two men were injured, one so seriously that no hope is entertained of his recovery. The mills stretch for a mile along the valley of the North Esk, and consist principally of small huts placed at some distance apart. After five o'clock last evening when most of the men had left or were preparing to leave the premises the district for miles around was startled by a great explosion followed by another of greater magnitude, and still another. When the dense cloud of smoke had cleared away and it was deemed safe to venture near the spot, the workmen whose progress had been arrested by the explosion, made an examination with the result indicated. Owing to the premises being lit throughout by the electric light the entire works were plunged into darkness after the explosion. It was seen, however, that three of the huts were destroyed, while everything in the vicinity bore evidence of the force of the explosion. Large trees were levelled with the ground; several huts made of corrugated iron were blown out of shape, and the windows of the buildings for a considerable distance around were smashed. The explosions had occurred in one of the three houses which are wrecked, and in which the processes known as mixing, corning, and pressing were conducted. The searchers found the bodies of the dead and injured men lying in all directions, and in several instances dreadfully mutilated. The names of the killed are:—Archibald Penman, unmarried; Archibald Chisholm, unmarried; John Blaikie, married; Robert Proudfoot, unmarried; and Samuel Niel. Blaikie had been thrown into the river. Penman's head and left arm had been blown off. Archibald Chisholm was living when he was picked up, but died almost immediately afterwards. Samuel Niel, who was also found alive, died about three hours afterwards from concussion of the brain. Peter Byrne, who was blown right across the river Esk, was found badly injured and burned all over the body, and is not expected to live. A man, named Cuthill, who happened to leave one of the huts at the time, escaped with little injury, and was able to walk home.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing water aqueous hydrochloric of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples. On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish, or Italian.

THE COMPOSITION OF AMERICAN LARD.—It will interest consumers to learn that the adulteration of this product, which has always been more or less doctored, has now assumed shocking proportions. Formerly, says *Iron*, the American manufacturers were satisfied to add merely from 15 to 20 per cent. of water, thus obtaining the value of lard for water. Now "lard" is made of cheap cottonseed oil, to which is added sufficient stearine, obtained as a refuse in the manufacture of margarine, to give the substance the consistency and hardness of natural lard. It is estimated that the annual American production of lard amounts to 2,700,000 cwt., of which quantity 35 per cent. is adulterated. A well-known American firm produces annually 270,000 cwt., and uses for the manufacture 120,000 cwt. of cottonseed oil and 30,000 cwt. of stearine. This "lard" is put into the market under the high sounding name of "refined lard," or "pure refined lard." A sanitary commission of the canton of St. Gallen, in Switzerland, has recently bestowed special attention upon the matter, and its investigations have fully confirmed the large extent to which adulteration is carried on. In the face of such facts, Dr. Ambuhl, a chemist of St. Gallen, has urged the Federal Government to either forbid the importation of the adulterated article altogether, or to impose such a heavy duty as to cause the product to disappear from the Swiss market.

DISSOLUTION OF PARTNERSHIP.—We notice that the partnership between Messrs. G. Dyson, F. Dyson, H. Dyson, and E. A. Brotherton, manufacturers of sulphate of ammonia, etc., at Leeds and Wakefield, has been dissolved as from June 30th, 1889. Since this date Mr. Brotherton has been continuing the business on his own account, and we have no doubt that under his able management the reputation of the old firm will be maintained, and the success of the new one assured.

ICE ON TELEGRAPH WIRES.—The man is not yet born who can tell what really happens in a wire when an electric current passes along it. That being so, he is, of course, not yet born who can explain why the silicium bronze telephone wires between Vienna and Buda Pesth have, during the recent frosts, been covered with ice from five to eight centimetres thick, whereas the adjoining iron telegraph wires have been covered to a thickness of only three centimetres.

REDUCTION IN TELEPHONE CHARGES.—The National Telephone Company formally announced yesterday to their subscribers to their Liverpool and district system that the rent for the use of telephones in that centre has been reduced from £20. to £15. per annum; and, further, that arrangements are now being rapidly completed for the establishment of telephonic communication between Liverpool and London.

Correspondence.

ANSWERS TO CORRESPONDENTS.

C.—Re Prize Competition.—The methods should be applicable not only to loys, but to any class of material containing the metals in question.

RY.—We are not surprised that the fact has struck you. We shall have something to say about it before long.

L.—Look up the back numbers to which you refer. You cannot possibly have as time at your disposal than we have.

F.—You have based your remarks on copper continuing at £50. per ton. What if rises or falls?

N.—Perhaps not; but we do not deal in prophecy.

A.—The process requires development before a sensible man would venture to express an opinion.

T.—To do as you wish is impossible. We are surprised at you asking it.

OURMAN.—The uses that have been found for the oil are simply legion. 2. You have not looked through our advertising columns.

CHANT.—Yes; they are making hay while the sun shines. They know it will not shine long.

S.—Thanks. We have just heard of another firm who propose to treat their puors in exactly the same way, so you are not alone in the matter.

INEER.—If the combination should break down, but not otherwise.

We do not hold ourselves responsible for the opinions expressed by our correspondents.

To the Editor of the Chemical Trade Journal.

DEAR SIR,—I do not wish to find any fault with the general tone of the article on Multiple Evaporation, and I am prepared to accept the result that can be shown in actual practice, but it seems to me that in the sentence quoted your writer strings on his "effects" without slightest regard to the conditions under which they can be added. I think it that if the initial pressure and temperature of the steam is such that four effects suffice to reduce it to 26" of mercury and 120° Fahr., the addition of a fifth effect will bring no further economy, unless the initial pressure and temperature be correspondingly raised. As regards the evaporation of caustic liquors by this method, I don't think it will be possible to utilise high pressures, even with the most careful management, if rivetted boilers are used. We have evaporated liquor of from 15° to 20° Tw. in Lancashire boilers for several years, but leakage is almost uncontrollable, even when the steam is escaping slowly, and the cocks only partially closed when blowing off the liquor, which only requires 3 or 4 lbs. of pressure.—Yours truly,

JAMES KAY HILL.

Fullarton Cottage, Irvine, 10th Jan., 1890.

THE COAL SUPPLY OF FRANCE.

A very new and original question (says the Paris correspondent of the *Daily Telegraph*) is beginning to occupy the attention of the War Office authorities, and as it is one on which M. de Freycinet, owing to his training at the Ecole Polytechnique and his engineering experience, is peculiarly qualified to pronounce an opinion, it is by no means unlikely that it may meet with a practical solution while he is the guiding spirit in the Rue Saint Dominique. It is a noteworthy fact that during the past ten years France has become more and more indebted to Belgium, England, and Germany, for a substantial proportion of her supply of coal. English fuel finds its way into upwards of forty-nine departments, Belgian into twenty-four, and German into sixteen. Now it is argued that if hostilities were to break out between France and her Eastern neighbour coal would in all probability be regarded "as contraband of war," in which case England and Belgium, at once, would cease to furnish this country with that very important commodity. Not only would the foreign supply fail at a very critical moment, but the department of the Nord, owing to its position at the frontier, might be manacled with invasion, and it is precisely this quarter that Frenchmen turn for a large proportion of their own coal. When, moreover, the fact is borne in mind that, with the exception of the coal in possession of the railway, gas, and other companies, which are always bound to have a certain quantity at the disposal of the Minister of War, the stock in hand at the present date is very small, it will at once be seen that if serious complications were to arise suddenly the outlook would be anything but reassuring. It is calculated that about 105,000 men are employed in the different coal mines. About one-half of these would have to leave and join their regiments in the event of a "mobilisation," to say nothing of the horses which would also be requisitioned. Under these adverse circumstances coal would only be forthcoming at the rate of 5,500,000 tons per annum for a country which consumes yearly 32,000,000 tons. Even assuming, for the sake of argument, that coal could be dispensed with for domestic and manufacturing purposes throughout the length and breadth of the land, this would by no means suffice. It is estimated that more than 14,000,000 tons would be required for the army, the

navy, the mercantile marine, railways, and other indispensable purposes. It is with a view to remedying—if only in part—this unsatisfactory state of things that the War Office had just turned its attention to a plan for the military organisation of the coal mines which may ere long be laid before the Chamber of Deputies. If this project be adopted only a fraction of the coal miners will be called out whenever war breaks out; the great majority continuing to work in their respective pits under the direction of the military authorities. All the miners will spend a twelvemonth with the military engineers, in order to be initiated in all the drill of that branch of the service; those among them who may be summoned to the colours in the event of hostilities rejoining the engineers, partly with a view to their working the enemy's coal mines, if their are successful in pushing to some distance beyond the frontier. Such are the broad outlines of a scheme which bids fair to find favour with the War office and the public at large.

Trade Notes.

A RISE IN QUININE.—The price of quinine has risen this last week in consequence of the inroads made upon the available stock by the consumption of influenza patients.

PURCHASE OF AN ANILINE COLOUR WORKS.—We hear that the Berlin Aniline Dye Company, Limited, have bought up the Aniline Colour Works of George Carl Zimmer, of Mannheim on the Rhine. With this they take over the manufacture of methylene blue, and enter the convention that exists for the sale of this colour.

A SUBSTITUTE FOR GLASS.—The new translucent substance intended as a substitute for glass has been adopted for some months in some of the public buildings of London, and various advantages are claimed for it, among these being such a degree of pliancy that it may be bent backwards and forwards like leather, and be subjected to very considerable tensile strains with impunity; it is almost as transparent as glass, and of a pleasant amber colour, varying in shade from very light golden to pale brown. The basis of the material is a web of fine iron wire, with warp and weft threads about one-twelfth of an inch apart, this being enclosed like a fly in amber, in a sheet of translucent varnish, of which the base is linseed oil. There is no resin or gum in this varnish, and, once having become dry, it is capable of standing heat and damp without undergoing any change, neither hardening nor becoming sticky. Briefly, the manufacture is accomplished by dipping the sheets edgewise into deep tanks of varnish and then allowing the coating, which they thus receive, to dry in a warm atmosphere.

SNOW-SWEEPING BY ELECTRICITY.—An electric snow-sweeper is used on the West End-street Railway of Boston. It consists of a low truck or car fitted with electric motors, drawing current from an overhead conductor. These motors not only propel the car, but drive the snow brushes, which are cylindrical, like the rotary hair brushes of a barber, one for each rail, before and behind the car, so that it can sweep forwards or backwards, as may be required.

THE SUFFOCATION OF A GASWORKS MANAGER.—A coroner's inquest was held on the 16th inst. at Festiniog on Mr. Morgan, manager of Festiniog Gasworks, who was suffocated on Tuesday by an escape of gas. Evidence was given that Mr. Morgan, assisted by a workman named Hughes, was endeavouring to increase the pressure of the gas in the street pipes by introducing it direct from the gasometer, when there was an escape, which rendered both men insensible. The medical testimony showed that Mr. Morgan was asphyxiated, and Hughes had a narrow escape, all efforts to resuscitate him proving for a time futile. The jury returned a verdict of accidental death.

A NEW ELECTRIC TRAMCAR.—An electric car on the new principle was tried on the Bristol-road tramway route at Birmingham recently with entire success. The car is of the same size as the cars on the Birmingham cable tramway. It is lighted with electricity, and it is to have an electric bell. The motor is in the front bogie, and the accumulators in which the electrical energy is carried are under the seats on both sides. It is expected that one of these cars will be able to run 70 miles with a single charge. This is a full day's work of the present cars. They are, however, only reckoned as half-day service cars, but the whole of the receptacle containing the power driving a car can be taken out at the depot and recharged in the space of five minutes. The present car is the outcome of a recent union of interests between the Julien, the Sprague, and the Electrical Power Storage systems. It has enabled the Central Company to meet the hopes recently expressed that the ultimate form in which electricity might be applied as the motive power of tramways in Birmingham should be the self-contained car and not a separate engine. Until recently the great difficulty in the employment of large cars with self-contained power has been the use of the driving chain, which has been found in practice to be noisy and liable to break. But this difficulty has been quite overcome by an ingenious arrangement which absolutely dispenses with the chain, and which is practically noiseless.

DECLINE OF THE CHESHIRE SALT TRADE.—The returns of salt exported from Cheshire show that during the past year there was a greatly diminished volume of business transacted, represented by a total of 745,111 tons, against 1,022,334 tons in 1888, and 994,726 tons in 1887. There was a falling off of something like 25,000 tons to the United States, and 15,000 tons to British North America. The exports to Calcutta were 221,616 tons, against 314,332 in 1888, or a drop of 92,000 tons. There is now a more active demand for salt, and a revival of trade is expected.

SEWAGE DISPOSAL AT SALE.—At a special meeting of the Sale Local Board, held last Wednesday, Mr. H. Burgess (chairman) presiding, the surveyor (Mr. A. G. M'Beath) submitted details of a scheme for the disposal of the sewage of the Board's district. The system to be adopted is known as the international process, and recommended as the most suitable for it, as the effluent can be turned into the river Mersey without fear of incurring complaint. The scheme will deal with 2,220,000 gallons of sewage per day, and pumping machinery will be constructed to deal with eight millions per day. The site of the works is at Dr. White's bridge. It is a little over $5\frac{1}{2}$ acres, and the cost of impounding tanks, filter beds, and pumping apparatus is estimated at £14,733. The cost of maintenance would be equal to a rate of 3d. in the pound per annum. It was decided that the plans should be thoroughly investigated with a view to their adoption.

THE WATER IN PARIS.—It is clear that the Parisians will have to bestow serious attention on the question of their supply of water. It has never been of the best, and tourists are well aware that they have always been cautioned to drink as sparingly as possible of it. Now, it seems that the difficulties connected with the supply of fairly potable water are greater than ever. The Vanne Canal, whence the bulk of the water was drawn, has broken down; the scheme to turn on the limpid stream of the Arve in the Eure department has not been carried out; and for the present there is nothing for it but to blend nasty Seine water with that of the springs so as to provide for the needs of the great city.

ARSENIC IN DEAD MEN'S BONES.—About the time that the public opinion of this country was being agitated by the Maybrick case, there was a corresponding feeling astir beyond the English Channel in consequence of the poisonings at Havre. The inquiries instituted in connection with the latter case are reported to have fully confirmed the results of the recent researches by M. G. Pouchet. The most important is that arsenic, if administered during life, will be found in the bones of a dead body when every trace of the poison shall have disappeared from the intestines, and even from the liver, where the arsenic is especially apt to be fixed. The arsenic is found to accumulate in the spongy tissue of all the bones, and especially when it has been absorbed in small doses over a long period. When the dose is sufficient to cause death in a few hours, then it is in the bones rich in compact tissue where the poison mostly accumulates.

FRAUDULENT DAMAGE ALLOWANCES.—In reviewing this subject the Secretary of the United States Treasury says:—"The law under which rebate of duties is allowed on imported merchandise for damage on the voyage of importation was passed in 1799, when water transportation was confined to sailing vessels. Owing to long voyages and incidental exposure to weather and water, merchandise was liable to damage and deterioration, from which the owner could not then, as now, protect himself by marine insurance. Within recent years almost all merchandise, subject to damage, is transported in steamers making quick transit, and there is but little liability to actual damage, so that the causes which led to the enactment of the original law have largely disappeared. The law has now become a convenient means for the perpetration of frauds of the most scandalous character, is demoralising to customs officials, and operates so uniformly and largely to the advantage of the unscrupulous, that its repeal is generally demanded by honest merchants throughout the country.

GERMAN VEGETARIANISM receives a severe blow just at the turn of the year. Its most zealous scientific partisan, its most-quoted learned authority, the writer of so many leaflets and polemical pamphlets; Dr. Alanus, sends the vegetarians his farewell.—"Warum ich nicht mehr vegetarisch lebe" (Why I no longer live as a vegetarian), such is the title of an article sent to the *Rheinish Courier* by Dr. Alanus. The former preacher of the vegetable diet writes:—"Having lived for a long time as a vegetarian without feeling any better or worse than formerly with mixed food, I made one day the disagreeable discovery that my arteries began to show signs of atheromatous degeneration. Particularly in the temporal and radical arteries this morbid process was unmistakable. Being still under 40 years of age, I could not interpret this symptom as a manifestation of old age, and being furthermore not addicted to drinking, I was utterly unable to explain the matter. I turned it over and over in my mind without finding a solution of the enigma. I, however, found the explanation which I had sought so long quite accidentally in a work of the excellent physician Dr. E. Monin, of Paris. The following is the verbatim translation of the passage in question:—"In order to continue

the criticism of vegetarianism we dare not lamented Gubler on the influence of the degeneration of the arteries. Vegetable salts than that of animal origin, introduces blood. Raymond has observed numerous monasteries of vegetarian friars, amongst whom scarcely 32 years old, whose arteries indurated. The naval surgeon Treille has atheromatous degeneration in Bombay as people live exclusively on rice. The vegetable blood vessels and makes prematurely old as old as his arteries.' It must produce a senile arch of the cornea, and phosphaturia. These newest results of medical investigation I have, as a matter of course, returned longer consider purely vegetable food as not only as a curative method which is of the greatest states. Some patients may follow this diet if it is not adapted for everybody's continued use the starving cure, which cures some patients continually by the healthy. I have become which has shown me that one single brutal most beautiful theoretical building."—*Cologne*

THE BELLITE COMPANY.—The Isle of Man new industry. A company called the Bellite works in Sweden, have purchased about Ballaskeig, Cornah, in the parish of Mougl having works constructed for the purpose of explosive called bellite. The reason for this is that the port of Stockholm is practically closed months, and the cost of fuel and materials great as in Sweden. The company desire goods at all times during the year, and this now from their new works. About 50 hands but when the manufacture is in full swing many.

THE SCOTCH OIL TRADE.—The *Economist* of a few days a conference, fraught with importance to the Scotch oil trade, will be held in London. Mr. representative of the Standard Oil Company, of over the Atlantic, in order to discuss certain matters cropped up amongst the producers of paraffin since prices ruling in 1889, when compared with 1886 Scotch trade of about £200,000, contrasted with of not less than £520,000, and compared with losses must be something enormous, as will be calculated that in the case of Young's Paraffin Company represent a difference in income of over £500,000 for the skill and management of those associations that, notwithstanding these great losses, they have maintained the trade in its present by no means

BRIQUETTES.—Patent fuel has had a fashion upon it, viz., "coal briquettes." Why not coal? N. Proctor, of Hunslet, New-road, has patented claims to possess the necessary qualifications "briquettes" at a much less cost than the average. Apart from the question of driving power, the cost cannot be more than one-third that of machines. As the small amount of pressure placed upon the briquettes render these articles much more suitable for the present system. The introduction of steam into the coal dust and pitch dust are mixed, rendered plastic, and great pressure is therefore found to machine turning out 16 blocks of 5 lbs. each per 21 tons per day, requires a driving power of about 1000 horse power may be made if required. Briefly, the machine is fed with coal and pitch dust through material then falls into a cylinder, where it is steamed, and made adhesive. By a "worm" arrangement the material is forced into a mould, and is then intermittent movement sends the brick into position operation of the same intermittent motion takes place comes down and forces the brick out of the machine and the next brick also into position for being pressed.

A PROSPEROUS COAL-CARRYING RAILWAY. Trade inquiry as to railway rates some interesting given in the last few days. A witness connected with the Great North-Eastern Railway—one of the great coal-carrying railways—that the dividend paid was 15 per cent. for the even higher rates had been paid. Beside such a North-Eastern Railway becomes very small in dividend is paid out of a low charge for the coal per ton per mile; then it became 7d. per ton per mile 0.55d. per ton per mile for full train loads. Possibilities that form one of the reasons why South Wales quantities of coal.

DUST EXPLOSIONS.—Dr. Marcet has been contending, before the Royal Meteorological Society, for the inflammability and explosive character of dust when mixed with air. He gives instances of explosions due to the presence of fine dust in coal mines and flour mills. The same opinion, as a frequent cause of explosions in mines, is gaining ground among those appointed by several European Governments to investigate the subject. It is a doctrine that should be familiar to the country readers, as having been long and ably advocated by Mr. Gimson, one of the local mine inspectors.

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

In the alkali trade, the firmness of prices continues, and all the ducts are sharing in the improvement. Bleaching powder, while hanged at £5. 2s. 6d. to £5 5s. for soft wood casks on rails at cinders' works, is moving off freely, and makers are not willing to offer for future deliveries, except at a premium on these figures. Soda ash and caustic soda are still in good demand, and the higher prices are freely paid. Chlorate of potash at 6¼d. per lb. is without material change in its position. Soda crystals are more scarce and dearer, advances of 2s. 6d. to 5s. per ton being now quoted for leading makes. Sulphate, vitriol, and muriatic acid are all selling freely at current rates. Sulphate of copper still disappoints those who look for a fall in price, and is in brisk demand, more particularly export trade, at £24. to £24. 10s. Sulphate of iron, more scarce and dearer generally. Acetates of lime and acetic acids firm on the market. Acetate of soda without change. Lead nitrate and acetate of lead with very little inquiry, but the higher values of raw material keep prices firm. Tartaric and citric acids generally disappointing holders, and only slow of sale at 1s. 3d. and 1s. 4d. respectively. Soda ash, caustic, and carbonate firmer. Prussiate of potash scarce and at 9½d. to 9¾d. per lb., according to make. Picric acid is finding ready outlet at 1s. 3¼d. to 1s. 5d. per lb. Carbolic acid stalls, dull at 11d. to 11¼d. per lb. for 34°, and there is a disposition to reduce prices for forward contracts. Iodine still untended, 8½d. to 9d. per oz. The state of trade generally in all chemicals for the use of dyers, calico printers, and other textile trades is still quiet. Aniline oil and salt are still firmly held by makers at the improved prices which have been ruling recently.

REPORT ON MANURE MATERIAL.

THE demand for mineral phosphates still continues, and anything afloat or for immediate steamer shipment is fetching very full prices. The market for other material seems scarcely so strong, though prices do not indicate any great variation from those stated a week ago.

Charleston River phosphate rock is worth fully 11d. per unit in gross, c. f. and i. to United Kingdom, afloat or for immediate shipment, and it is doubtful whether less would be accepted for shipment further ahead. The strikes which were interfering with the shipment of Belgian are at an end, but quotations for this description of phosphate have advanced to about 8d. per unit, cost, freight, and insurance, 40/45%, and fully 10½d. would have to be paid for 48 to 53 % quotations for Somme remain without change, and for Canadian the prices must be considered as nominal in the absence of any business ordered, say at about 1s. for 70%, 13½d. for 75%, and 15d. for 80 % river Thames, Mersey, or Clyde. One-fifth rise in each case.

A small cargo of River Plate bones, November sailing, sold at 15s., but this price must be considered as exceptional, sellers being able to get even £5. 12s. 6d. for a 500 ton mixed December cargo. The market for East Indian bones remains without material change, buyers requiring £5. for shipment ahead, and buyers being unwilling to pay more than £5. 7s. 6d. East Indian bone meal is a shade easier, and being now sellers at £5. 10s., Liverpool, Hull, or Glasgow, and buyers meantime holding off in expectation of doing a shade better. Nitrate of soda continues very dull, and 8s. 3d. must be considered closing spot value. Due cargoes are worth barely 8s. 4½d., and 6d. would have to be taken for November shipments. Buyers are pursuing a hand-to-mouth policy in purchasing, believing that the market must further succumb under the very large visible supply. The tendency of superphosphates is still to harden, and value of 26% can now rarely be quoted under 50s. per ton, in bulk, f.o.r. at works. We have no further business to report in ground hoof, but shipments of River Plate dried blood are now on the way, and we shall presently, doubt, see more doing in this article.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

In the paraffin section there is a good rise to note as regards lubricating oils, these being clearer in all the grades, so far as the better qualities of makes are concerned. The mount is a substantial one, ranging from 5s. to 10s. a ton, but dealers are reckoning that it is not to hold for any considerable time, being due mainly to passing influences, chief of these being a higher quotation by the American producers. The British-American paraffin scale delegates met in London last week, but adjourned without issue, decision to be arrived at next meeting, which will probably have place in the first week of February. Here there is much dubiety as to the result, but some makers are sanguine that the Americans will consent to a fractional rise in scale at least. Burning oil remains very weak, and uncalled-for stocks attain serious bulk in the hands of makers, who will probably feel compelled, ere all is over, to carry forward portion of their customers' contracts to next season. Sulphate of ammonia is quite idle at about £11. 17s. 6d., Leith nominal value, although reserves by no means bulk largely. Demand for general chemicals has slackened during the week, and recovery in caustic and bleach has been checked. Soda crystals, however, are firmer, forming about the only other exception, unless sulphate of copper be included, with its slightly enhanced quotation. Chief prices current are:—Soda crystals, 50s. net Tyne; alum in lump, £5., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1½d. less 2½% Tyne; caustic soda, white, 76°, £9., 70/72°, £7. 15s., 60/62°, £7., and 60/62° cream, £6. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5., and 1 cwt. casks, £5. 5s. net Tyne; refined alkali, 48/52°, 1¾d., less 2½% Tyne; saltcake, 25s. 6d. to 26s.; bleaching powder, £6. 2s. 6d. to £6. 10s.; less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¾d., less 5% any port; nitrate of soda 8s. 3d. to 8s. 4½d., sulphate of ammonia, £11. 17s. 6d. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £36. and £34., less 2½% any port; sulphate of copper, £24. less 5% Liverpool; paraffin scale, hard, 2¾d., soft, 2d.; paraffin wax, 120°, semi-refined, 2¼d.; paraffin spirit (naphtha), 9d.; paraffin oil (burning), 6¾d. to 7d., at Glasgow; ditto (lubricating), 86½°, £5. 10s. 88½°, £6. to £6. 10s.; and 890/895°, £7. 10s. to £8. Week's imports of sugar at Greenock were 7,284 bags only.

THE LIVERPOOL COLOUR MARKET.

COLOURS without material alteration. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

TAR AND AMMONIA PRODUCTS.

TUESDAY.

There is a good inquiry for Benzoles of all description, and prices have risen considerably; 90's are now worth 4s. per gallon, and 50/90's 3s. 2d. to 3s. 3d. Solvent naphtha is in good demand, and the better qualities are moving upwards in price. Creosote is moving off well, there being no stocks in the makers' hands. Crude carbolic acid remains in much the same state as quoted in our few last reports, the position of this article for the future being rather uncertain. In anthracene, speculators continue to be active, and sales of a quality are reported at 1s. 6d. per unit, while for B quality 1s. 3d. to 1s. 3½d. is to-day's market value. Consumers generally appear to be holding back, as the prices now reached are out of all proportion to the price of alizarine, which is easily obtainable at 8½d. to 9d. per lb.

The sulphate market continues dull, but still there is no fear that prices will continue so low as are quoted to-day. The Hull market has fallen to £11. 17s. 6d., though we believe sales have been made at £11. 18s. 9d. London price is £12., but Beckton has, we understand, been offered at £11. 17s. 6d., and this is the price also f.o.b. Leith. It is strange that sulphate makers should show such little faith in the strength of their position, and, as a rule, give way at times when their ideas should be stronger, and we would advise them to carefully peruse that portion of the article on nitrogenous manures which appeared in our leader commencing the New Year's number.

THE LIVERPOOL MINERAL MARKET.

Our market has continued to improve further, and the previous advance in prices has been maintained. Manganese: Arrivals have been somewhat larger, but as they have gone into consumption, and stocks have been drawn from, we have experienced a further advance. Magnesite: Raw lump unchanged, raw ground, £6. 10s., and calcined ground, £10. to £11. Bauxite (Irish Hill brand): The production is scarcely able to keep pace with the consumption, and prices are very firm. Lump done at 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine; arrivals continue. French Chalk: Arrivals have been very small, whilst there has been a good demand, and prices are firmer, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate unchanged; best lump, 35s. 6d.; good medium, 30s.; medium 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone is unchanged; ground at £10., and specially selected lump, finest quality, £13. Iron ore: The improvement continues, with a prospect of further advance in prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 14s. to 18s. Purple ore, 12s. 6d. Spanish manganese ore well sold, but orders are being taken for forward delivery at 27s. 6d. for 20%. Emery-stone: best brands rather scarce, and bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls, £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal more inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys, 2s. per lb. Chrome ore in better demand, especially for high percentages. Antimony ore and metal has further advanced. Uranium oxide, 24s. to 26s. Asbestos: best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore dearer; smalls, £12. to £13.; selected lump, £14. to £15. Calamine: best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand, brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluor spar, 20s. to £6. Bog ore in good demand for best quality—22s. to 25s. Plumbago: more offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, scarce on spot—20s. to 22s. 6d. Ferro-manganese selling at very much higher prices. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	61/3	....	60/4
Tin.....	£94 2 6	....	£94 0 0
Copper.....	50 6 3	....	48 17 6
Spelter.....	24 10 0	....	24 10 0
Lead.....	14 5 0	....	13 10 0
Silver.....	—	....	44 3/8

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto.....	16 3/4	16 7/8	16 1/2
Mason & Barry....	6 1/8	7 1/8	6 1/8
Tharsis.....	4 1/4	4 1/8	4 3/8
Cape Copper Co..	3 3/8	3 3/4	3 1/8
Namaqua.....	2 3/8	2 3/8	2 1/8
Copiapu.....	2 3/8	2 3/4	2 1/8
Pamulcillo.....	1	1 1/8	1 1/8
Libiola.....	3 1/2	3 3/4	3 1/2
New Quebrada....	7/8	1	7/8
Tocopilla.....	2/9	2/6	1/9
Argentella.....	6d.	1/-	6d.

Gazette Notices.

PARTNERSHIPS DISSOLVED.

DEAN, G., DYSON, F., BROTHERTON, E. A., and DYSON, H., Wakefield and Leeds, manufacturing chemists.
GENT, J. T., and ELLERY, H. G., Leicester, under the style of Gent and Co., electrical engineers, and under the style of the Midland Electric Wire Company, electric wire coverers.

Notices of Dividends.

WHITHAM, JOSEPH, Miles Platting, chemical manufacturer, trading as Joseph Whitham and Company, Pendleton, dyer and printer, and as the Whitescroft Printing Company, Baxenden, galvaniser; also trading with T. Brayshaw, as Whitham and Brayshaw, at Manchester, and residing at Nelson. Third and final dividend of 3d. any day, Trustees' Office, 2, Clarence Buildings, Booth-street, Manchester.

New Companies.

ELECTRICAL ENGINEERING CORPORATION, LIMITED.—This company was registered on the 13th inst., with a capital of £150,000., in £5. shares, 400 of which are founders' shares, to carry out an agreement (unregistered) of the 9th inst., between R. B. Rennie (for the United Electrical Engineering Company, Limited) of one part, and J. G. Statter (for this company) of the other part; and another agreement of even date between J. G. Statter and Company, Limited, of one part, and E. Manville (for this company) of the other part, for the transfer to this company of the businesses of the United Electrical Engineering Company, Limited, and J. G. Statter and Company, Limited. The subscribers are:—

	Shares.
C. Samuel, 176, Sutherland-avenue.....	1
W. L. Madgen, 3, Prince's-mansions, electrical engineer.....	1
W. G. Ainslie, M.P., 21, Ennismore-gardens.....	1
J. G. Statter, C.E., Engineering Works, West Drayton.....	1
H. B. Statter, Snapethorpe, near Wakefield, Associate Royal School of Mines.....	1
P. E. Scrutton, Alliance Engineering Works, West Drayton, secretary.....	1
E. Manville, 3, Prince's mansions, Victoria-street, electrical engineer.....	1

JESSE FISHER and SON, LIMITED.—This company was registered on the 13th inst., with a capital of £10,000., in £1. shares, to trade as chemical manufacturers, and as makers of surgical instruments, appliances, and requisites. An unregistered agreement of the 13th inst., between W. S. Rothband and G. W. Fox will be adopted. The subscribers are:—

	Shares.
W. S. Rothband, 61, Elizabeth-street, Cheetham, Manchester, manufacturing chemist.....	1
M. Kersh, 7, Dantzic-street, Manchester, wholesale clothier.....	1
L. King, 29, Thomas-street, Manchester, cigar manufacturer.....	1
A. Barber, 20, Thomas-street, Manchester, fancy goods dealer.....	1
J. Bayley, 44, Kennedy-street, Manchester, accountant.....	1
J. Crompton, Chorlton-on-Medlock, Manchester, clerk.....	1
T. Ashton, 10, Buckingham-street, Manchester, cashier.....	1

MINERALS and FULLERS' EARTH SYNDICATE, LIMITED.—This syndicate was registered on the 13th inst., with a capital of £2,000., in £100. shares, to purchase mines, quarries, beds of fullers' earth, and other minerals in the United Kingdom. The subscribers are:—

	Shares.
Joseph Day, Bath, engineer.....	1
H. N. Garrett, Bath.....	1
C. W. Thistle, Bath, clerk.....	1
A. J. King, Bath, solicitor.....	1
L. S. Cocking, Huddersfield, drysalter.....	1
A. G. D. Moger, Bath.....	1
W. B. Hallett, 11, Queen Victoria-street, auctioneer.....	1

PURNELL HIGH-SPEED GAS ENGINE and MANUFACTURING COMPANY, LIMITED.—This company was registered on the 13th inst., with a capital of £50,000., in £1. shares, to acquire certain patents referred to in an unregistered agreement of 2nd inst., between John James Purnell and Joseph White; and to carry on business as mechanical, gas, electrical, and general engineers. The subscribers are:—

	Shares.
Joseph White, 2, Goldsmith-street, Gough-square, E.C., publisher, &c.....	1
A. W. Mantle, 52, Queen Victoria-street, engineer.....	1
Sidney Smith, 2, Robin Hood-court, Shoe-lane, contractor.....	1
J. E. Jackson, 3, Eton-road, Hampstead, engineer.....	1
A. H. Skan, 40, Algernon-road, Lewisham, shorthand writer.....	1
J. H. Jack, 41, Chesilton-road, Fulham, secretary to a company.....	1
H. C. Fowler, 8, Plevna-villas, St. Paul's-road, Tottenham, shorthand writer.....	1

GLENDON LAND and BRICK COMPANY, LIMITED.—This company was registered on the 10th inst., with a capital of £15,000., in £5. shares, to carry on at Kettering, Northampton, the business of brick, tile, and patent fuel manufacturers. The subscribers are:—

	Shares.
G. H. Hoyle, Victoria-street, Westminster, solicitor.....	1
R. H. Hepburn, Parliament-mansions, engineer.....	1
J. Spence, Kettering.....	1
R. Waddington, Kettering, stationer.....	1
A. D. Studd, Kettering, engineer.....	1
T. Morris, Kettering, engineer.....	1
E. J. Deason, Kettering, engineer.....	1

LONDON PAPER MILLS COMPANY, LIMITED.—This company was registered on the 10th inst., with a capital of £75,000., divided into 4,000 ordinary shares of £10. each, and 100 founders' shares of £1. each, to carry on business as paper manufacturers in all branches. The subscribers are:—

	Ord. Founders' Shares.
T. L. Roberts, Bedford-park, Croydon.....	1
R. D. Wilkinson, 2 Elmwood-road, Croydon.....	1
A. L. Poulter, 6, Arthur-street West, E.C., wholesale stationer.....	60
A. E. Reed, Highdene, Sidcup, paper maker.....	40
E. C. D. Poulter, 6, Arthur-street West, wholesale stationer.....	1
G. Griffiths, J.P., 24, Fitzjohn's-avenue, N.W.....	1
A. J. Rhodes, Chislehurst.....	1

NEW ASBESTOS COMPANY, LIMITED.—This company was registered on the 10th inst., with a capital of £120,000., in £4. shares, to acquire the business of asbestos manufacturers and merchants, carried on by the Société Française des Amiantes at Tarascon, France, and elsewhere, including certain asbestos properties in France and Italy. The subscribers are:—

	Shares.
John Pound, 81, Leadenhall-street, manufacturer.....	1
H. W. Maynard, 34, Gracechurch-street.....	1
W. B. Wright, E.C., Rosslyn, Ealing.....	1
H. H. Hyde Clarke, 32, St. George's-square, S.W.....	1
J. Simpson, Hampton Wick, merchant.....	1
W. Field, 22, Buckingham-street, Strand, engineer.....	1
W. M. Donnelly, 37, Lombard-street, secretary.....	1

Bones—

Valparaiso, 1,000 sks. Jones & Roberts
Karachi, 376 bgs. W. & R. Graham
Kurrachee, 1,334 Ralli Bros.
" 497 W. & R. Graham & Co.
Colon, 31 A. Dobell & Co.

Boric Acid—

Leghorn, 41 cks. Shropshire Union Co.

Brimstone—

Catania, 150 t.

Bone Meal—

Kurrachee, 179 bgs. W. & R. Graham & Co.

Karachi, 213**Borate of Lime—**

Valparaiso, 1,580 bgs. Ceeckhain, Allandice

Cream Tartar—

Rotterdam, 6 cks.

Caoutchouc—

Alaska, 466 bgs. Royal Niger Co.

Addah, 93 cks. J. P. Werner

" 11 W. J. Rodatz & Co.

Winnah, 3 cs. F. & A. Swanzy

Salt Pond, 4 3 brls. Pickering & Berthoud

" 3 F. & A. Swanzy

" 1 Davies, Robbin, & Co.

" 3 W. B. M'Iver & Co.

" 1 Radcliffe & Durant

" 1 cks. S. C. Nordlinger

" 1 T. E. Tomlinson & Co.

" 1 W. Griffiths & Co.

" 1 A. Miller, Bros., & Co.

" 1 J. J. Fischer & Co.

C. C. Castle, 4 W. B. M'Iver & Co.

" 11 Fletcher & Fraser

" 11 Hobson & Co.

" 1 T. Crouch

" 6 L. Hart & Co.

" 6 Ihlers & Bell

" 2 T. E. Tomlinson & Co.

" 1 Havard & Co.

" 1 Whinster & Watson

" 1 Mordaunt Bros.

" 1 A. Mellerson & Co.

G. Ranam, 1 bg. Pickering & Berthoud

" 1 J. Stadelmann

" 3 cks. A. Verdiere

" 3 F. & A. Swanzy

Acaya, 7 8 pns. 3 brls.

" 2 brls. J. J. Fischer & Co.

" 13 C. Lane & Co.

" 2 F. & A. Swanzy

" 4 T. H. Gallie & Co.

Monrovia, 1 J. E. Dennelle, Son, & Co.

Manoh, 8 brls. Palma Trading Co.

Lamnah, 5 Cie Francaise

" 14 brls. Palma Trading Co.

Sierra Leone, 18 pns. 15 brls. Cie Francaise

" 8 Paterson, Zachonis & Co.

" 46 Pickering & Berthoud

Para, 429 cs. R. Singlehurst & Co.

" 30 Schwann & Co.

" 47 Bieber & Co.

" 1,115

Carbonic Acid—

Hamburg, 50 bskts.

Copper Ore—

Leghorn, 170 bgs. Vivian, Bond, & Co.

Lisbon, a quantity. Harrington & Co.

Cobalt Ore—

Haver, 1,925 bgs. Cunard S. S. Co.

Dyestuffs—

Ochineal

Col. Canary, 73 bgs. Lathbury & Co.

" 9 Widow, Duranty, & Son

" 10 Kolp & Co.

" 9 Swanson & Co.

" 51 W. H. Cole & Co.

Cutch

Rangoon, 2,584 bks.

Sumac

Palermo, 100 bgs. H. Rooke, Sons, & Co.

" 100 H. Kitchen

" 710 410 bls.

Gambier

Singapore, 6,594 bls.

" 897 E. Boustead & Co.

Extracts

New York, 17 brls.

Philadelphia, 100 bks.

Bordeaux, 394 cks.

Orchella

Colon, 26 bls. Mathison & Bausire

Argols

Bordeaux, 57 cks. Ger. Bank

Oporto, 23

Madder

Bordeaux, 10 cks.

Divi Divi

Hamburg, 444 bgs.

Antwerp, 1 brl.

Bordeaux, 14 cks.

Bordeaux, 14 cks.

Stettin, 25 cks. W. Slater

" 8 J. Brooks

Baltic, 11

Hamburg, 185 bgs. 69 cks.

" 10

Horn Piths—

Valparaiso, 661 bgs.

Dunkirk, 7 cks.

Iodine—

Valparaiso, 176 brls. A. Gibbs & Son

" 7 W. & J. Lockett

Isinglass—

Maranham, 2 cks. Gunston, Sons, & Co.

" 1 R. Singlehurst & Co.

Para, 14 cs. Bieber & Co.

Manganese Ore—

Gothenburg, 105 t. Macqueen, Bros., & Co.

Phosphates—

Antwerp, 150 t.

Pyrates—

Huelva, 1,044 t. Tennants & Co.

" 1,330

" 1,427

Plumbago—

Genoa, 11 cks.

Phosphate Rock—

Coosaw, 2,020 t. J. Adger & Co.

Potash—

Dunkirk, 9 cks.

Pitch—

Bordeaux, 50 cks.

Potash Salts—

Hamburg, 494 bgs.

Salt—

New York, 18 crts. L. Rapp & Co.

Antwerp, 20 bgs.

Saltpetre—

Rotterdam, 135 bgs.

Sodium Silicate—

Rotterdam, 7 cks.

Soda—

Rotterdam, 40 brls.

" 1 cs.

Sodium Nitrate—

Pisagua, 9,864 bgs.

Sulphur—

Catania, 140 bgs.

Palermo, 20

Stearine—

New York, 150 brls.

Antwerp, 13 bgs.

Saltpetre—

Hamburg, 50 cks.

Tartaric Acid—

Rotterdam, 39 cks.

Hamburg, 8

Tartar—

Rotterdam, 2 cks.

Valparaiso, 9 bls. Bates, Stokes & Co.

Bordeaux, 53 cks.

Tar—

New York, 531 brls. Cayser, Irvine & Co.

Tartar Emetic—

Hamburg, 13 cks.

Ultramarine—

Rotterdam, 33 cks.

Verdigris—

Marseilles, 10 cks.

Zinc Ashes—

New York, 43 brls. R. Crooks & Co.

Zinc Oxide—

Antwerp, 200 brls. 25 cks.

Stettin, 150

Antwerp, 75 J. T. Fletcher & Co.

GLASGOW.

Week ending Jan. 19th.

Alum—

Rotterdam, 79 cks.

Brimstone—

Sicily— 800 t. T. Lawrie

Boracite Ore—

Panderna, 518 t. Jos. Townsend, Ltd.

Barytes—

Rotterdam, 44 cks. Jas. Rankine & Son

Charcoal—

Antwerp, 210 bgs.

Chemicals (otherwise undescribed)

Hamburg, 4 cs.

Dyestuffs—

Valonia

Smyrna, 550 t. Martin & Miller

Extracts—

New York, 6 brls.

Antwerp, 27 cks. 1 cs.

Alizarine

Rotterdam, 121 cks. Jas. Rankine & Son

Cutch

Boston, 10 cks. 1 kg.

Gypsum—

Rouen, 140 t.

Glucose—

Hamburg, 200 bgs.

Manganese—

Rotterdam, 4 cks. Jas. Rankine & Son

Pyrates—

Huelva, 1,124 t. Tharsis Co.

Potash—

Dunkirk, 20 drms. M. Perls & Co.

Soda—

Rouen, 10 cks.

Sulphur Ore—

Huelva, 1,279 t. The Rio Tinto Co., London.

Salt—

Rotterdam, 3 cks. Jas. Rankine & Son

Spirits of Turpentine—

Charleston, 1,500 cks. L. M'Lellan

Stearine—

Rotterdam, 33 cks. J. Rankine & Son

Tar—

Wilmington, 1,750 brls. John Parker

Turpentine—

Wilmington, 400 brls. John Parker

Tartar

Rotterdam, 4 cks. Jas. Rankine & Son

Verdigris—

Bombay, 1 brl.

Ultramarine—

Rotterdam, 5 cs. Jas. Rankine & Son

Waste Salt—

Hamburg, 300 t.

Zinc Oxide—

Rotterdam, 50 cks. Jas. Rankine & Son

Antwerp, 85

HULL.

Week ending Jan. 9th.

Acid—(otherwise undescribed)

Rotterdam, 1 ck. Geo. Lawson & Sons

Amsterdam, 24 W. & C. L. Ringrose

Alumina—

Rotterdam, 40 cks. W. & C. L. Ringrose

Barytes—

Rotterdam, 22 cks.

Bremen, 23 Tudor & Son

" 19 Blundell, Spence & Co.

Chemicals (otherwise undescribed)

Antwerp, 6 brls. 54 pkgs. Wilson, Sons & Co.

" 4 cks. Bailey & Leatham

Hamburg, 61 brls. 11 pkgs. J. Pyefinch & Co.

Bremen, 1 ck. J. Pyefinch & Co.

Bari, 94 pkgs. 40 cks. Wilson, Sons & Co.

Dyestuffs—

Alizarine

Rotterdam, 16 cks. Hutchinson & Son

" 34 W. & C. L. Ringrose

" 35 2 cs. Hutchinson & Son

" 41 pkgs. W. & C. L. Ringrose

Sumac

Trieste, 109 bgs. Wilson, Sons & Co.

Palermo, 325

" 1,850

Glucose—

Hamburg, 200 bgs. Wilson, Sons & Co.

" 200 C. M. Lofthouse & Co.

" 100 A. C. Hornstead & Co.

" 17 cks. Rawson & Robinson

" 100 cs. 450 bgs. 59 cks.

" 35 cks. Woodhouse & Co.

" 30 Rawson & Robinson

Stettin, 37 Wilson, Sons & Co.

Guano—

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Jan. 4th.

Ammonia Sulphate —	
Mauritius, 10 t.	£160
Hamburg, 309 2 c.	3717
Jersey, 46	650
Genoa, 100	1,250
Ghent, 150	1,842
Madeira, 2 1 c.	25
Ammonia Carbonate —	
Cologne, 1 t. 2 c.	£30
Ammonia —	
Singapore, 3 c. 2 q.	£20
Acetic Acid —	
Melbourne, 1 t. 4 c.	£33
Acids (otherwise undescribed)	
Pt. Natal, 6 cs.	£16
Alumina Sulphate —	
Bordeaux, 7 t. 6 c.	£25
Arsenic —	
Wellington, 13 c.	£12
Acetic Acid —	
Wellington, 20 cs.	£35
Bone Superphosphate —	
Las Palmas, 6 t.	£26
Bisulphite of Lime —	
Bombay, 2 t. 13 c.	£26
Carbolic Acid —	
Rotterdam, 36 brls.	£273
Copper Sulphate —	
Brussels, 5 t. 4 c.	£130
Alexandria, 11	11
Wellington, 1	24
Antwerp, 9 17	220
Citric Acid —	
Libau, 10 c.	£74
Hamburg, 2 kegs.	15
Brussels, 15	111
Karachi, 2 2 q.	1
Genoa, 2	15
Cream Tartar —	
Brisbane, 17 c.	£99
Carbonate of Lime —	
New Orleans, 5 t. 19 c.	£83
Caustic Potash —	
Algoa Bay, 12 dms.	£13
Adelaide, 14 c.	31
Carbolic Solid —	
Rotterdam, 40 cks.	£560
Caustic Soda —	
Hobart, 15 t. 5 c.	£115
Chemicals (otherwise undescribed)	
Sydney, 9 cks.	£137
Disinfectants —	
Natal, 15 t. 1 c.	£17
Hamb.-12, 10 cks.	40
Dried Blood —	
Las Palmas, 25 t. 1 c.	£200
Manure —	
Hamb.-12, 205 t.	£2,517
Amsterdam, 40	360
Genoa, 41 17 c.	100
Mexico, 1	13
Mauritius, 45	600
Canaria, 22	250
Superior, 20	300
Lyons, 10	217
Wellington, 20 13	25
Natal, 20	270
Magnesium Sulphate —	
Lyons, 1 t. 12 c.	£200
Oxalate Potash —	
Lyons, 2 t. 1 c.	£200
Sodium Chlorate —	
Lyons, 2 t. 1 c.	£200
Lyons, 2 t. 1 c.	£200
Lyons, 2 t. 1 c.	£200
Lyons, 2 t. 1 c.	£200

Phosphorous—

Wellington, 4 cs. £40

Sheep Dip—

E. London, 25 cs. 12 c. £103

Sulphuric Acid—

E. London, 15 c. £10

Salammoniac—

Alexandria, 5 cks. £49

Soda Ash—

Hobart, 13 t. 2 c. £69

Saltpetre—

Oporto, 7 t. 15 c. £160

Sodium Bichromate—

San Francisco, 1 c. £2

Sodium Sulphate—

Ghent, 50 t. £50

Sulphur Flowers—

Algoa Bay, 50 pkgs. £32

Superphosphate of Lime—

Oporto, 9 t. 17 c. £45

Tartaric Acid—

Brisbane, 15 c. £118

Liverpool.

Week ending Jan. 4th.

Alkali—

Boston, 5 cks. £105

Ammonia Muriate—

Havre, 1 t. 5 c. £49

Alum Sulphate—

M. Video, 22 t. 0 c. 3 q. £88

Ammonia Sulphate—

Antwerp, 30 t. £360

Alum—

Portland, M. 6 t. 1 c. £30

Antimony Regulus—

Hamburg, 5 t. 1 c. £334

Ammonia Carbonate—

Antwerp, 3 t. 4 c. £90

Acetic Acid—

Vera Cruz, 23 cks. £150

Bleaching Powder—

Bari, 2 cks. £10

Bombay, 10 cs.

Boston, 910 cks. 362 tcs.

Bilboa, 19 brls.

Baltimore, 47

Barcelona, 2

Genoa, 203

Havre, 50 cks.

Coruna, 8 brls.

Havana, 5 cks.

Leghorn, 20 cks.

Lisbon, 15

Nantes, 158

New York, 531

Philadelphia, 169

Seville, 18 brls.

Terneuzen, 25 cks.

Vigo, 10 brls.

Blood Albumen—

Vera Cruz, 3 t. 1 c. £114

Brimstone—

Vera Cruz, 50 t. £225

Ponce, 4 9 c. 1 q. 32

Boston, 25 140

Borax—

Alexandria, 19 c. 3 q. £28

Hamburg, 13 19

M. Video, 1 t. 28

Adelaide, 1 3 c. 33

San Juan, 4 3 q. 6

New York, 55 3 1,696

Batoum, 10 20

Malaga, 3 5

Syra, 17 25

Caustic Soda—

Algiers, 20 dms.

Algoa Bay, 10

Amsterdam, 35

Ancona, 40

Antwerp, 20 brls. 10

Bahia, 30

Baltimore, 300

Barcelona, 40 cks. 323 dms.

Bari, 221

Beyrout, 10

Boston, 200

Calcutta, 204

Canada, 33

Carril, 6 brls. 6

Galveston, 68

Genoa, 148

Gothenburg, 23

Hiogo, 100

La Guayra, 10

La Libertad, 40

Malaga, 55 brls. 82

Nantes, 60

New Orleans, 715

New York, 670

Oporto, 10

Palermo, 10

Pernambuco, 10

Pasages, 5

Philadelphia, 27 brls. 8

Portland, M. 600

Port Alegre, 20

Puerto Cabello, 20

Rio Janeiro, 25

San Francisco, 20 bxs 125 dms. 20 brls.

Seville, 50 kgs. 446 dms. 97 brls.

Sydney, 25

Tarragona, 48

Trieste, 15

Vigo, 30

Varna, 10

Venice, 18

Yokohama, 500

Chemicals (otherwise undescribed).

Colon, 7 pkgs. £41

Vera Cruz, 5 cks. 30

Lisbon, 18 c. 3 q. 31

Colombo, 2 t. 16 c. 10

Copper Sulphate—

Pasages, 29 t. 19 c. 3 q. £527

Ancona, 35 7 645

Antwerp, 10 3 200

Barcelona, 115 8 1 20 745

Bilboa, 19 brls.

Baltimore, 47

Barcelona, 2

Genoa, 203

Havre, 50 cks.

Coruna, 8 brls.

Havana, 5 cks.

Leghorn, 20 cks.

Lisbon, 15

Nantes, 158

New York, 531

Philadelphia, 169

Seville, 18 brls.

Terneuzen, 25 cks.

Vigo, 10 brls.

Carbolic Acid—

Rotterdam, 18 t. 10 c. £2,536

Vera Cruz, 1 7

Montreal, 5 1 q. 19

Calcutta, 4 16

New York, 2 3 116

Copper Precipitate—

Rouen, 9 c. £14

Copperas—

Nantes, 5 t. 10 c. £115

Calcutta, 43 4 2 q. 76

Bombay, 12 17 2 29

Constantinople, 2 9 10

Charcoal—

Nantes, 203 t. 13 c. £820

Citric Acid—

Havana, 1 c. £8

Montreal, 10 7

Disinfectants—

Callao, 40 glns. £15

Epsom Salts—

Catania, 16 brls.

Glycerine—

Hamburg, 5 t. 11 c. £140

Magnesia—

Genoa, 2 cs.

Havana, 12

Manure—

Grand Canary, 1 t 19 c. £9

Valencia, 10 30

Magnesium Chloride—

Bombay, 10 t £25

Nitric Acid—

Santos, 5 clys. £20

Pitch—

Genoa, 1,605 t.

Marseilles, 1,401

Sierra Leone, 30 kgs.

Potassium Chlorate—

Genoa, 1 t. £42

Lisbon, 2 10 c. 145

New York, 15 695

Rotterdam, 5 241

Hiogo, 5 210

Terneuzen, 1 46

Philadelphia, 10 56

Boston, 23 17 600

Mexico, 2 5

Alexandria, 1 49

Rio Janeiro, 3 163

Gothenburg, 9 13 481

Hong Kong, 1 10 70

M. Video, 1 3 2 q. 11

Bari, 1 41

Phosphorus—

Kingston, 2 q. £7

San Juan, 5 c. 1 107

Vera Cruz, 15 100

Buenos Ayres, 1 t. 19 c. 115

Picric Acid—

Boston, 5 c. £28

Potashes—

Antwerp, 1 t. 15 c. 2 q. £38

Potassium Bichromate—

Havana, 4 c. 2 q. £7

Higo, 3 t.	30
Lisbon, 10 c.	14
Santos, 1 t.	46
Salt—	
Antwerp, 567 t.	
Baltimore, 500	
Barbadoes, 102	
Black Point, 13	
Bonny, 100	
Boston, 775	
Brisbane, 49	
B. Ayres, 20	
Calcutta, 6,804	
Cape Town, 220	
Galveston, 520	
Ghent, 60	
Gr. Bassa, 10	
Isles de Los, 58	
Milwaukee, 65	
New Orleans, 600	
Old Calabar, 18	
Pennacola, 500	
Portland, M., 117	
San Francisco, 94	
Trinidad, 24	
Winnebago, 201 bgs.	
Soda Ash—	
Adelaide, 40 brls.	
Altona, 110 tcs.	
Baltimore, 41 705 cks.	
Bahia, 25 brls.	
Barcelona, 35 4 cks. 6 cks.	
Bombay, 2	
Boston, 250 bgs. 405 cks. 138 tcs.	
B. Ayres, 200 brls.	
Canada, 10 cks.	
Carthagena, 30 brls.	
Constantinople, 20	
Ghent, 14 cks.	
Madrid, 35 brls.	
Maranham, 30 brls. 40 tcs.	
Malaga, 5	
M. Video, 310	
Nantes, 19 cks.	
New York, 283 tcs. 45 cks.	
Oporto, 10 dms. 20 tcs.	
Philadelphia, 984 90 cks.	
P. Cobello, 8 brls.	
Portland, M., 80 cks.	
Rio Janeiro, 150 brls.	
Singapore, 450	
Salonica, 6 cks.	
Seville, 10 brls.	
Velo, 39	
Smyrna, 67	
Vigo, 10 cks.	
Soda Crystals—	
Bombay, 100 kegs	
Baton, 420 brls.	
Calcutta, 20	
Cape Town, 80	
New Orleans, 200	
Port Elizabeth, 40	
Seville, 10	
Smyrna, 120 brls. 50 brls.	
Sodium Bicarbonate—	
Barcelona, 100 kegs	
Calcutta, 250	
Gema, 54	
Mexico City, 20	
Nantes, 6 brls. 20	
Rotterdam, 175	
Salonica, 20	
Tarragona, 20	
Yokohama, 250	
Sodium Carbonate—	
Antwerp, 40 brls.	
Sodium Silicate—	
Salamanca, 4 brls.	
Seville, 34	
Sheep Dip—	
B. Ayres, 18 4 c. 2 q. £532	
Galveston, 11 74 374	
M. Video, 2 1 61	
Sulphuric Acid—	
Amazilia, 4 c. £65	
Rangoon, 880 glns. 84	
Saltcake—	
Philadelphia, 75 t. 10 c. £159	
Baltimore, 210 10 -353	
Sodium Nitrate—	
Bari, 1 t. 15 c. 1 q. £16	
Malaga, 12 17 111	
Valencia, 13 2 6	
New York, 16 3 22	
Almeria, 3 6 2 28	
Almeria, 1 5 2 10	
Salmoniac—	
Palermo, 10 c. 2 q. £18	
Prussia, 6 10	
Bombay, 23 t. 2 786	
Calcutta, 5 5 180	
Barcelona, 1 2 35	
Malta, 3 3 5	
Constantinople, 2 t. 1 c. 71	

Saltpetre—	
Sydney, 12 t. 10 c. £275	
Maceio, 1 12 40	
Maranham, 11 1 q. 13	
Paiza, 16 18	
Las Palmas, 2 3 2 42	
Sodium Sulphate—	
San Francisco, 13 c. 1 q. £65	
Catania, 2 t. 7	
Antwerp, 10 brls. 11	
Sulphur—	
Boston, 73 t. 8 c. £332	
Portland, 35 5 3 q. 170	
Madras, 4 19 31	
Rio de Janeiro, 9 6 59	
Bahia, 1 7	
Iquique, 29 4 3 172	
Monte Video, 76 16 388	
Sodium Biborate—	
Rotterdam, 10 c. 1 q. £16	
Havre, 1 t. 2 2 34	
Bordeaux, 3 2 2 94	
Tar—	
Habana, 10 brls.	
Maranham, 5	
Calcutta, 50	
Tannic Acid—	
Rouen, 7 c. £43	
Magog, 4 2 q. 32	
Vera Cruz, 1 cs. 28	
Tartar—	
New York, 12 c. £1,140	
Zinc Muriate—	
Bombay, 5 t. 19 c. £60	
Zinc Chloride—	
Rotterdam, 5 t. 4 c. £88	
Bombay, 10 8	
Zinc Oxide—	
Maranham, 8 c. £10	

GLASGOW.

Week ending January 9th.

Ammonia Sulphate—	
Antwerp, 30 t. £360	
Hamburg, 10 132	
Ammonia—	
Buenos Ayres, 1 t. 2 c. £36	
Bones—	
Antwerp, 10 t. £32	
Bleaching Powder—	
Calcutta, 5 t. 4 c. £40	
Melbourne, 6 40	
Benzol—	
Rotterdam, 4 drms. 30 pns. £320	
Caustic Soda—	
Japan, 29 t. £205	
Litharge—	
Antwerp, a quantity	
Manure—	
Antigua, 22 t. 19 c. £151	
Manganese—	
Rotterdam, 3 cks. £12	
Naphtha—S	
Rouen, 19 t. £342	
" 86	
Potassium Bichromate—	
Japan, 38 t. 9 c. £1,300	
Antwerp, 23 10 721	
Italy, 9 9 273	
Barcelona, 16 12 600	
Rouen, 9 6 260	
Boston, 3 13 140	
Bergen, 12 ck. 14	
Amsterdam, 12 175	
Paraffin Wax—	
Antwerp, 4 t. 1 c. £91	
Italy, 11 10 251	
Cape Colony, 6 3 125	
Bordeaux, 6 11 157	
Barcelona, 34 894	
Pitch—	
Rochfort, a quantity	
Amsterdam, 99 t. £30	
Calcutta, 3 30	
Rouen, 130 130	
Bordeaux, 350 350	
Potassium Prussiate—	
Italy, 2 t. 8 c. £132	
New York, 19 £76	
Salt—	
Brisbane, 150 t.	
Sulphuric Acid—	
Bombay, 7 t. 10 c. £37	
Sodium Bichromate—	
Italy, 19 t. 5c. £501	
Rouen, 10 9 325	
Boston, 3 15 100	

Sulphur—	
Madras, 7 t. 13 c. £42	
Salmoniac—	
Melbourne, 2 t. 5 c. £73	
Soda Ash—	
Boston, 4 t. 16 c. £30	
Tar—	
Singapore, 31 t. £105	
Madras, 5 18 c. 21	
Cacutta, 14 18 47	

HULL.

Week ending Jan. 7th.

Alkali—	
Venice, 66 cks.	
Benzol—	
Rotterdam, 24 cks.	
Chemicals (otherwise undescribed)	
Amsterdam, 25 cks.	
Antwerp, 6 cs. 28 cks. 19 pkgs.	
Bergen, 10	
Bombay, 5 2,208 5	
Copenhagen, 40 40	
Christiania, 4 2 20	
Dunkirk, 1 1	
Genoa, 18 25 2	
Ghent, 2	
Gothenburg, 40 74 25	
Hamburg, 99 22 6	
Harlingen, 57	
Naples, 10	
Reval, 1	
Rotterdam, 1 50	
Stettin, 10	
Trieste, 22	
Venice, 35	
Caustic Soda—	
Bergen, 4 drms.	
Dyestuffs (otherwise undescribed)	
Antwerp, 1 pkg.	
Bombay, 182 cks.	
Genoa, 50 t.	
Hamburg, 2 drms. 5 cks.	
Reval, 1 cs.	
Rotterdam, 1 pkg. 16	
Horn Piths—	
Hamburg, 54 pkgs.	
Manure—	
Hamburg, 458 t	
Naphtha—	
Dunkirk, 26 cks.	
Pitch—	
Antwerp, 522 t. 20 bls.	
Dunkirk, 125	
Genoa, 214	

TYNE.

Week ending January 8th.

Alum Lump—	
San Francisco, 20 t. 11 c.	
Alum Cake—	
Copenhagen, 12 t. 8 c.	
Alkali—	
Rotterdam, 5 t. 12 c.	
New York, 50 3	
Rotterdam, 1 7	
Ammonia Sulphate—	
Rotterdam, 20 t.	
Antimony—	
Rotterdam, 10 t.	
Hamburg, 1 4 c.	
New York, 31 12	
Barcelona, 5	
Aluminium—	
Hamburg, 1 cs.	
Alum—	
Rotterdam, 10 t. 6 c.	
Bleaching Powder—	
San Francisco, 30 t. 4 c.	
Antwerp, 49 18	
Copenhagen, 32 9	
Antwerp, 31 4	
Rotterdam, 13 13	
Antwerp, 9 2	
Rotterdam, 10 6	
Antwerp, 28 4	
Rotterdam, 6 12	
Hamburg, 1 19	
Christiania, 33 11	
Dunkirk, 5	
New York, 235 t. 11 c.	
Rotterdam, 2 5	
" 2 11	
" 15 1	
Copenhagen, 22 9	

Barytes Carbonate—	
Hamburg, 9 t. 14 c.	
New York, 50	
Caustic Soda—	
Antwerp, 2 t.	
Hamburg, 2 16 c.	
Christiania, 9 11	
Barcelona, 33	
New York, 101	
" 15 7	
Rotterdam, 2	

Gypsum—	
New York, 105 t. 4 c.	

Glycerine—	
Rotterdam, 8 t. 7 c.	
Hydrate of Baryta—	
Hamburg, 30 t. 10 c.	

Litharge—	
Copenhagen, 11 c.	
Magnesia—	
Rotterdam, 1 c.	
Barcelona, 6 t. 5	
New York, 1 12	

Manure—	
St. Heliers, 200 t.	
Potassium Chlorate—	
Rotterdam, 10 c.	
Antwerp, 2	
" 3 t.	
Hamburg, 1 5	
Barcelona, 1 2	
Randers, 1	
Rotterdam, 5	

Plumbago Crucibles—	
Aarhus, 5 c.	
Soda Ash—	
San Francisco, 53 t. 1 c.	
Antwerp, 7 6	
Christiania, 5 12	
Gothenburg, 40 11	
New York, 115 10	
Copenhagen, 19 14	

Soda—	
San Francisco, 109 t. 17 c.	
Aarhus, 24 3	
Frederikshavn, 10 8	
Copenhagen, 20 5	
Rotterdam, 5 1	
Svendborg, 28 8	
Ergastiria, 10	
Aarhus, 23 10	
Aalborg, 47 9	
Barcelona, 16 8	
Randers, 54 3	

Sodium Sulphate—	
Copenhagen, 14 t. 16 c.	
Sodium Bicarbonate	
Rotterdam, 10 c.	

GRIMSBY.

Week ending Jan. 4th.

Coal Products—	
Dieppe, 10 cks.	
Chemicals (otherwise undescribed)	
Dieppe, 24 cks.	
" 12 drms.	
Hamburg, 26 cks.	
Rotterdam, 12	
Dyestuffs (otherwise undescribed)	
Rotterdam, 2 cks.	

GOOLE.

Week ending Jan. 1st.

Alkali—	
Dunkirk, 20 cks.	
Benzol—	
Dunkirk, 48 cks.	
Hamburg, 18 drms.	
Rotterdam, 83 cks.	
Coal Products—	
Calais, 11 cks.	
" 162	
Ghent, 4 cs.	
Chemicals (otherwise undescribed)	
Dunkirk, 17 cks.	
Rotterdam, 136	
Rouen, 50 bgs.	
Dyestuffs (otherwise undescribed)	
Ghent, 15 cks.	
" 6 drms.	
Rouen, 4 cks.	
Manure—	
Boulogne, 102 bgs.	
Dunkirk, 430	
Rotterdam, 296	
" 1 ck.	

PRICES CURRENT.

THURSDAY, JANUARY 23, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary

Items	Units	£	s.	d.
Acetic, 25 % and 40 %	per cwt	7/6	&	12/6
" Glacial	"	2	10	0
Arsenic, S.G., 2000°	"	0	12	0
Chromic 82 %	nett per lb.	0	0	6 1/2
Fluoric	"	0	0	3 1/2
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
" (Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1 1/2
Oxalic	nett	0	0	3
Picric	"	0	1	5
Sulphuric (fuming 50 %)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (" 150°)	"	1	8	0
" (free from arsenic, 140/145°)	"	1	10	0
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	0 1/2
Tartaric	"	0	1	3
Arsenic, white powdered	per ton	12	15	0
Alum (looselump)	"	4	12	6
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 880=28°	per lb.	0	0	3
" =24°	"	0	0	1 1/2
" Carbonate	nett	0	0	3 1/2
" Muriate	per ton	24	0	0
" (sal-ammoniac) 1st & 2nd	per cwt.	36/-	&	34/-
" Nitrate	per ton	37	10	0
" Phosphate	per lb.	0	0	10 1/2
" Sulphate (grey), London	per ton	12	0	0
" (grey), Hull	"	11	17	6
Aniline Oil (pure)	per lb.	0	0	11 1/2
Aniline Salt	"	0	0	11
Antimony	per ton	75	0	0
" (tartar emetic)	per lb.	0	0	1
" (golden sulphide)	"	0	0	10
Barium Chloride	per ton	7	0	0
" Carbonate (native)	"	3	15	0
" Sulphate (native levigated)	"	45/-	to	75/-
Bleaching Powder, 35 %	"	5	2	6
" Liquor, 7 %	"	2	10	0
Bisulphide of Carbon	"	12	15	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	0	0
China Clay (at Runcorn) in bulk	"	16/-	to	32/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	6
Benzol, 90 % nominal	per gallon	0	4	0
" 50/90	"	0	3	3
Carbolic Acid (crystallised 35°)	per lb.	0	0	11
" (crude 60°)	per gallon	0	2	10
Creosote (ordinary)	"	0	0	2 1/2
" (filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30 % @ 120° C.	"	0	1	2
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	12	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	6
Coke-oven Oils (crude)	"	0	0	2 1/2
Copper (Chili Bars)	per ton	49	0	0
" Sulphate	"	24	0	0
" Oxide (copper scales)	"	52	10	0
Glycerine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	55	0	0
Iodine	nett, per oz.	8d.	to	9d.
Iron Sulphate (copperas)	per ton	1	10	0
" Sulphide (antimony slag)	"	2	0	0
Lead (sheet) for cash	"	16	0	0
" Litharge Flake (ex ship)	"	17	10	0
" Acetate (white ")	"	23	10	0
" (brown ")	"	19	0	0
" Carbonate (white lead) pure	"	19	0	0
" Nitrate	"	22	5	0

Items	Units	£	s.	d.
Lime, Acetate (brown)	"	8	5	0
" (grey)	per ton	14	0	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	7	6
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	2	15	0
Manganese, Sulphate	"	18	0	0
" Borate (1st and 2nd)	per cwt.	60/-	&	42/6
" Ore, 70 %	per ton	4	5	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	9
" Miscible, 60° O.P.	"	0	4	0
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	22	10	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5 1/2
" American	"	0	0	6 1/2
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	18	5	0
" Chlorate	per lb.	0	0	4 1/2
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85 %	per ton	23	0	0
" (Caustic Potash) 75/80 %	"	21	15	0
" (Caustic Potash) 70/75 %	"	20	15	0
" Nitrate (refined)	per cwt.	1	3	6
" Permanganate	"	4	5	0
" Prussiate Yellow	per lb.	0	0	9 1/2
" Sulphate, 90 %	per ton	9	10	0
" Muriate, 80 %	"	7	15	0
Silver (metal)	per oz.	0	3	8 1/2
" Nitrate	"	0	2	5 1/2
Sodium (metal)	per lb.	0	4	0
" Carb. (refined Soda-ash) 48 %	per ton	5	5	0
" (Caustic Soda-ash) 48 %	"	4	2	6
" (Carb. Soda-ash) 48 %	"	4	15	0
" (Carb. Soda-ash) 58 %	"	5	12	6
" (Soda Crystals)	"	2	13	6
" Acetate (ex-ship)	"	16	0	0
" Arseniate, 45 %	"	10	0	0
" Chlorate	per lb.	0	0	6 1/2
" Borate (Borax)	nett, per ton	29	10	0
" Bichromate	per lb.	0	0	3
" Hydrate (77 % Caustic Soda)	per ton	9	0	0
" (74 % Caustic Soda)	"	8	10	0
" (70 % Caustic Soda)	"	7	17	6
" (60 % Caustic Soda, white)	"	6	17	6
" (60 % Caustic Soda, cream)	"	6	10	0
" Bicarbonate	"	5	0	0
" Hyposulphite	"	5	0	0
" Manganate, 25%	"	8	10	0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	3
" Nitrite, 98 %	per ton	27	10	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7
" Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40 %	per cwt.	2	0	0
" Sulphate (Salt-cake)	per ton	1	6	0
" (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98 %	"	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	7 1/2
" Barium, 95 %	"	0	0	5 1/2
" Potassium	"	0	0	7 1/2
Sulphur (Flowers)	per ton	7	0	0
" (Roll Brimstone)	"	6	0	0
" Brimstone: Best Quality	"	4	15	0
Superphosphate of Lime (26 %)	"	2	10	0
Tallow	"	25	10	0
Tin (English Ingots)	"	99	0	0
" Crystals	per lb.	0	0	6 1/2
Zinc (Spelter)	per ton	24	10	0
" Chloride (solution, 96° Tw.	"	6	0	0

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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THE GOVERNMENT TAX-GATHERER ON THE WAR PATH.

WE have often stated in these columns that the enemy to the expansion of Commerce is the Englishman. By this we do not mean the Englishman, though even he often spite his face, but the species of the genus particularly refer is the official Britisher Government tax-gatherer. The chemist is not enough, and more than enough, to put up with the result of being legislated for by a set of persons, totally ignorant of the ways and means of patent laws have been designed, ostensibly of protecting the native inventor, but in reality of stopping English progress and placed in the hands of the foreigner; our spirit laws have been the use of alcohol in home industries that have been driven abroad. In this last trade, it is a cause for chagrin to find that have been and are created by the Government who should, whatever else may happen, be to place the interests of their own country of departmental aims and ends. The chief departments should be men of understanding who can swallow the gnat, even if they have occasional camel, and who, moreover, will not much of that intermeddling so natural to those whose only chance of promotion lies in having at some period of their existence a nest.

The Customs are, perhaps, more sinned against than sinning, but the Inland Revenue department close its zeal to the world by playing the part of a meddling officer, and interfering with native manufacture in a warrantable manner; and in a way not to be believed, by the framers of the Acts which give effect to the action of this department.

It will be known to many of our readers that they have been made to render tar distillers liable to be imposed upon all alcohol distillers, and that of some meddling officer have even endeavored to vitriol rectifying retorts into the revenue and some vitriol rectifiers have even paid a fine, in order to escape further annoyance.

There is, no doubt, the intention of the Government to keep a sharp look out upon all appliances which might be used to produce illicit alcohol, and emphatically, that either a tar still or a retort be used to produce alcohol, if employed for a purpose which it is ordinarily intended. If the Chief of Inland Revenue thinks otherwise, we should like to have the "Dew of Ben Nevis" run over from a mellow old tar still, and send it to our friends as a drop of tasty "Old Scotch."

But the subject has even a more ridiculous side from the orts which have lately been made to induce sulphate of ammonia makers to pay a tax on their sulphate of ammonia. No doubt the exciseman has thought that he has reseen a grand haul here, but in getting the little fishes to his net he must take care that the big ones do not burst the meshes and let all out together. A sulphate of ammonia still is about as unlike an apparatus contemplated in the act as anything can possibly be. In it a true distillation does not take place, but by means of a rapid current of steam the ammonia gas, the carbonic acid, and the sulphurated hydrogen are driven out of the liquor undergoing treatment, and are passed through oil of vitriol to arrest the ammonia and allow the foul gases to escape. But the lynx eye of the exciseman sees a similarity, and so he "goes for" the poor manufacturer.

What is distillation? Nothing more nor less than the process of evaporation in a closed vessel, so that to be consistent the exciseman should pounce down upon all owners of kettles and saucepans, to say nothing of the vacuum boilers of the sugar refiners and the drying ovens of a multitude of other trades.

But we will now give the Board of Inland Revenue a line which they have hitherto neglected, and which may bring some grist to their mill, for which they seem ever on the alert. They have shamefully neglected what appears to us, looking at the comic side of the question, a source of revenue, easy to collect, extensive in its ramifications, and with a *locale* easily identified—we refer to the steam-boiler. What is this but a huge still; in it the evaporation is carried on without contact with the air, the distillate is collected and utilised; what more could the exciseman want to prove his case? Why not make the owner of a steam-boiler pay a still-licence and throw his works open to the prying inspection of a troop of tub-gaugers. Suppose some day an enterprising steam user were to put fermented mash in his boiler and work his engines with the weak alcohol vapour distilled over, finally condensing the exhaust alcohol and so defrauding the revenue, what a serious loss it would be to the department!

We hear the official mind exclaiming—Oh! that can never be. It is quite as probable as that whisky will ever be produced from a tar still, or that "fine Hollands" will be made in a sulphate of ammonia still, and we hope that all sulphate makers and tar distillers will combine and stand solid against the innovation of the still tax.

THE DEMAND FOR ALUMINUM.

THE growing favour with which aluminum is regarded is shown by the rapidly-increasing demand for the new metal. This demand has grown to such an extent that the producing capacity has become inadequate, and manufacturers are being pushed. The Pittsburgh Reduction Company has, since its recent cut in prices, been far behind its orders, and has decided on a step which will insure a temporary relief at least from the pressure.

On Monday they placed orders for three 208 h.p. Babcock and Wilcox boilers, two 250 h.p. Westinghouse Compound engines, and two 125,000 light dynamos.

The dynamos are to be used in the separation of the metal from the clay, and were ordered from the United States Electric Light Company. This step is the initial one in a movement to increase the output of their plant to six times the present amount. Their capacity will then be two or three times larger than that of any other plant in world. They will at once begin the erection of an iron building, 70 by 120 feet, adjoining their present works on Smallman-street, between 32nd and 33rd, and will have the new works in operation inside of 90 days. The urgent necessity of the step on the part of the company is readily understood when it is stated that for the month of November orders equalling twice the present output were received, and the same is true of December.

SUPPLY AND USE OF NICKEL AND ITS ALLOYS WITH STEEL.

The most interesting paper and the most instructive excursion of the recent meeting of the American Institute of Mining Engineers at Ottawa related to the Sudbury, Ontario, copper-nickel deposits. The paper was read by Dr. E. D. Peters, manager of the Canadian Copper Company at Sudbury, and it covered an exhaustive description of the deposits, which were originally thought to be of such importance as a source of copper supply that apprehension was felt in some quarters that they would affect the price of the metal. Such, so far at least, has not been the case, though the workings have proved immense bodies of nickel-bearing pyrrhotite, with occasional pockets of copper pyrites. In places this bed has been proved to be 100 feet thick, and its limits have not yet been ascertained. The three mines in the district belonging to the Canadian Copper Company are not uniform in character, and vary considerably in the amount of nickel contained in the ore. The Stobie mine, which possesses the largest bodies of ore, and is worked by open cast, as much as 560 tons being thrown down by one blast recently, is low in nickel, but is valuable from its iron contents, after roasting, as a flux for the oars containing a higher percentage of nickel and copper, but more mixed with gangue.

Mining on this system means cheap production, and we can quite believe that Dr. Peters is correct in his estimate that he can produce from this mine 80 tons a day, at 30 to 35 cents a ton. In the Copper Cliff mine the ore occurs in irregular masses, but is very rich in nickel, and large bodies are developed, carrying from 8 to 10 per cent. in that metal. The Evans mine also has a large body of pyrrhotite, but is more highly nickeliferous than the Stobie. This mine produces about 60 tons of first-class ore a day.

The roasting and smelting arrangements, as might be expected under Dr. Peters' management, are models of ingenuity and efficiency, and the result is that about 40 tons of matte are produced a day, averaging about 27 per cent. of copper and 15 to 18 per cent. of nickel. The furnace work is worth recording, one smelter averaging for months of continuous work 125 tons of ore for 24 hours, and having gone as high as 156 tons. Fuel seems to be the only disadvantage, Connellsville coke being used at the somewhat high cost of about 7 dols. 25 cents a ton, but against this is to be set the judicious handling of the ore and its fluxing qualities, which enables the fuel to carry a burden of 8 to 1.

The result of these operations at Sudbury will be an enormous increase in the world's supply of nickel. The supply hitherto has been principally from the mines of the French Company in New Caledonia, and this supply has been regulated to a great extent by the demand, at about 1,000 tons a year, maintaining the price at what the company considered a profitable basis, or rather as high a figure as it could without decreasing consumption, for it has never shown very great profits. The Sudbury production already exceeds the world's consumption, and Dr. Peters has no doubt that he can produce 2,000 tons of nickel a year.

The important question is, will there be a market for this increased supply of the metal even at considerably lower prices than those at present ruling? Mr. James Riley, the well-known metallurgist and manager of the Steel Company of Scotland, in a paper prepared by him at the request of the Council of the Iron and Steel Institute of Great Britain on tests made by him of alloys of nickel and steel, furnishes data which convince him that there will be such a market. It appears that in France a patent has been taken out for these alloys, and Mr. Riley visited the works at which the process was carried on, and continued his tests at his own works in Scotland with most remarkable and satisfactory results. His data, as usual, are clear, and the results are conclusive, although, as he says himself, several series of tests involving a very large number of separate experiments are necessary to a full investigation. We have not space to give in detail here the actual tests carried out, but some of the conclusions arrived at will be sufficient for our steel makers to appreciate the importance of the subject.

The alloy can be made in any good open-hearth furnace working at a fairly good heat. The charge can be made in as short a time as an ordinary "scrap" charge of steel—say about seven hours. Its working demands no extraordinary care; in fact, not so much as is required in working many other kinds of charges, the composition being easily and definitely controlled. If the charge is properly worked, nearly all the nickel will be found in the steel—almost none is lost in the slag, in this respect being widely different from charges of chrome steel. Any scrap produced in the subsequent operations of hammering, rolling, shearing, etc., can be re-melted in making another charge without loss of nickel.

The addition of 4.7 per cent. of nickel raises the elastic limit from 16 up to 28 tons and breaking strain from 30 up to 40 tons per square inch without impairing the elongation or contraction of area to any noticeable extent. With only 3 per cent. of nickel somewhat similar

results are found, combined with an increase in the carbon to 0.35 per cent.

The hardness increases as the nickel is increased, until about 20 per cent. is reached, when a change takes place, and successive additions of nickel tend to make the steel softer and more ductile. In Mr. Riley's hardening and tempering tests he shows the possibility of very largely raising the strength and elastic limit, and the hardness of these alloys, but he is not yet prepared, from lack of time, to say to what extent. He has, however, gone up to 95.6 tons breaking strain and 54 tons elastic limit. With regard to torsion tests, it is not necessary to have a steel high in nickel, as those containing only 1 per cent. gave the best results.

In the very important matter of corrodibility, the steel rich in nickel are practically non-corrodible, and those poor in nickel are much better than other steels. The theory of the inventors, from which many metallurgists dissent, is that steel is composed of crystals of metallic iron, cemented together by carbide of iron, and the extra strength given is by the nickel alloying with this carbide of iron to form a stronger "cement;" that the space between the crystals of iron is thus more completely filled, and the cohesion between them rendered much more powerful.

The applications and uses of such an alloy are boundless. Its vast increase of strength and elasticity over ordinary steel, its non-corrodibility and hardness alone, open for it a field in engineering that will render possible what was previously nearly impossible from the masses requisite to attain the object. For example, it seems to bring quite within the bounds of practicability a cantilever bridge over the North River between New York and Jersey City that shall excel even the Forth Bridge, with its 1,710 feet spans and 150 feet elevation, as a work of engineering skill and beauty. It is only necessary to remember the difference between 30 tons and 95 tons breaking strain, and 17 tons and 54 tons elastic limit.—*Eng. and Min. Jour.*

NOTE ON THE PURIFICATION OF ALCOHOL FOR LABORATORY USES.

BY E. WALLER, PH. D.

Comparatively recently several papers have appeared on the subject of the reactions of potassium permanganate with alcohols, and the impurities which they may contain.*

In preparing alcoholic solutions of caustic alkalies, and also of silver nitrate (for fat tests, etc.), I have been annoyed, as have other chemists, by the unsatisfactory character of the solutions bought in consequence of the presence of impurities in the alcohol obtained for laboratory use. I find also that most alcohol of 93 per cent. when kept in tin cans, slowly reacts on the tin, giving after a while a cloud of SnO_2 , which is too fine to filter out, and renders purification by distillation necessary. In the light of the results obtained by the writers above alluded to, I have adopted the following method for the purification of my alcohol, on which I ask the criticism of the members of the society.

A convenient amount of the alcohol to be purified is shaken with pulverized potassium permanganate until it assumes a decided colour. It is then allowed to stand for some hours, until the permanganate has been decomposed, and brown manganese oxide is deposited. A pinch of pulverized calcium carbonate is then added, and the alcohol distilled at the rate of about 50 c.c. in 20 minutes from a flask provided with a Wurz tube, or one of the Lebel-Heninger pattern. The distillate is tested frequently until about 10 c.c. thereof, when boiled with 1 c.c. of strong (syrupy) solution of caustic soda or potash, gives no perceptible yellow colouration on standing for twenty minutes or half an hour. What distills over after that time is preserved for use.

The first distillates may be added to the small amount remaining in the distilling flask (which should not be driven down to complete dryness), and a fresh portion of purified alcohol recovered.

The rationale of the proceeding appears to be that the permanganate oxidises and destroys chiefly the fusel oil, furfural and other compounds of that nature, the acids resulting from the reaction are neutralized by the calcium carbonate added before distillation, and by distilling slowly, the aldehyde at least is concentrated in the first portions of the distillate. Distillation of alcohol containing caustic potash or soda seemed to cause a constant formation of aldehyde. The alcohol thus purified is perfectly neutral, and gives most satisfactory results when used as a solvent for caustic alkalies or silver nitrate, the solutions remaining as colourless as distilled water, even after boiling and standing indefinitely, if properly protected from dust and other external influences.—*J. Am. Ch. S.*

**Hagermann*, *Fres. Ztschr. anal. Chem.* 27, 663. *Rosen*, *ib.* 28, 355. *Casassa*, *Bull. Soc. Chim. (Paris)* [3] 1, 700. See also *Dingl. Polyt. Jour.*, 273, 314.

OZOKERITE.

THIS peculiar mineral has for some years past occupied a very important position in its useful application to the improvement and preservation of insulated conductors. Being an insulator itself of a high quality, it readily lends itself, from its wax-like nature, to a combination with other insulators, or with textile fabrics.

Hitherto it has not been found in any considerable quantities, except in Galicia and Moldavia, in Austria, from which places our supplies have been received; but latterly an important discovery has been made of some mines in Utah, in the United States, which are now being opened out with very great success. The supplies, which hitherto were only obtainable from Austria, will now, fortunately for America, be obtained there. This is a favourable circumstance, as very large quantities of ozokerite are used in the States for purposes other than those electrical. It is employed for the numerous needs for which "wax" is required, and in the electrical industry it is used either by itself, or in combination with other materials. Certain well-known insulating products rest upon ozokerite as their principal support.

This mineral, which is fairly well-known, is obtained by mining, but from the careless character of these operations its production has been attended with some risk to life. Small quantities have been found in the United Kingdom, but our supplies commercially have come from Austria, and the shipments to this country have been very large, as ozokerite has been extensively used in what may be termed the "wax," as well as the electrical, industry.

Ozokerite, or "ozokerit," as it is indifferently spelt, is composed of about—

Hydrogen.....	13.75
Carbon	86.25

And it melts at a rather low temperature, but slightly higher than "paraffin" wax, to which, in many ways, it bears a faint relation. The character of the mineral slightly varies, and its quality or degree of hardness undergoes variations according to the different methods of purifying and refining. These qualities differ to the extent that the melting point extends from as low as 140 degs. to about 170 degs., which is about the finest quality that is produced.

The fact that ozokerite was an insulating substance was known soon after its introduction commercially into this country, for we find, by referring to our patent records (where the history of many a subject may be traced), that a patent was taken out on the 31st December, 1869, by Augustus Matthiessen, for an "insulating substance for the covering of electric telegraph conducting wires, and for electric telegraph apparatus and insulators." This invention, we learn, consists in the application of "ozokerite" or "earth wax." "Ozokerite may be applied in its natural state, or its residues or products may be incorporated with gutta-percha, India-rubber, or other known insulating substances, with or without the admixture of fibrous substances."

In 1872, on the 29th April, the late Henry Highton applied for a patent—for which provisional protection only was granted—for the application to the conducting wires of cables which are covered with gutta-percha, caoutchouc, or similar materials, of a solution of paraffin, ozokerite, or shellac, to fill up the minute pores and improve the insulation.

In 1875, on the 27th May, a patent was applied for and granted to Messrs. Field and Talling, which is interesting, as it relates to the first patent in 1869. "The compounds made according to Specification 3,778-1869, viz., by mixing together ozokerite and gutta-percha, or like substances, by heat, having been found to be brittle and therefore useless as coatings for telegraph wires, the present invention consists in using solvents to dissolve the 'ozokerit' and elastic gums, or in masticating with or without the use of solvents."

In the same year, on November 25th, a patent was taken out by the late W. T. Henley, for improvements in insulating conductors. "The improvement in the method of insulating the conductor consists in curing the India-rubber covered conductors in ozokerite, paraffin, or other similar hydro-carbon, instead of in high-pressure steam." "A double vessel, or steam-jacketed cylinder, is used, the outer vessel or jacket only being charged with steam; the inner vessel is charged with hot hydro-carbon." "According to another plan, the core is cured by high-pressure steam, dried, and treated with ozokerite or paraffin under heat and pressure." In the following year Mr. Henley took out a further patent for passing the insulated conductors through ozokerite. Subsequently, patents were taken out by others, but these have no particular interest.

Previous to this date, and through many subsequent years, the Messrs. Field, who were the sole importers of "ozokerite," were investigating with much skill and trouble, and at considerable expense, the various qualities and peculiarities of this material: and they succeeded in producing the various very fine qualities of ozokerite for electrical and other purposes which are generally so well known. It may be mentioned, however, that they were successful in obtaining a compound of this material and India-rubber, which they termed "nigrite,"

which has been used for insulating wire in a manner similar to gutta-percha. We are not aware that this wire has come into any extensive use, but that it has been tried and found capable of being manufactured is a matter of fact. We have ourselves tried some experiment with this kind of wire, extending over a very considerable period, and have found it to stand many severe tests, remaining after the lapse of several years in an unaltered condition.

Amongst the users of ozokerite will be found the Postal Telegraph Department, who have for a period exceeding eleven years used it almost entirely for the protection of their underground gutta-percha insulated wires, as a substitute for the Stockholm tar hitherto almost universally used, but abandoned on account of its action upon the quality of the gutta-percha wire at that time employed. The action of Stockholm tar upon gutta-percha was well known as tending to considerably reduce the insulation, but it had been, and still is, in certain quarters, used in combination with some fabric, as the best preservative for gutta-percha wires underground or in tunnels. The gutta-percha covered wires were protected with tape well-tarred, and with the best quality of material this had been found to answer remarkably well; but about the year 1878, the use of tar was abandoned, and some experiments having been for a length of time tried with ozokerite, it was found suitable, and since that date it has been almost continuously used. The use of ozokerite was tried experimentally several years before tar was finally abandoned. As a preservative by itself it was not found to be of the practical value anticipated, as it did not tend to preserve the fabric it was used in connection with to the extent expected. A certain admixture of Stockholm tar—whose antiseptic qualities have been so well proved—was found to give the desired results, and since the abandonment of pure tar the underground gutta-percha wires of the Post Office have been protected by tape well soaked in a mixture of ozokerite and tar. As a practical result it may be worth while mentioning that the use of ozokerite has been found to improve the insulation.

The preparation of the cables for the underground service of London and provincial towns is an important work, and has invariably been carried out, formerly by the Electric and International Telegraph Company, and subsequently by the Post Office at Gloucester Road Factory. Where the insulated wires have been received direct from the manufacturers, and first having been thoroughly covered with the tape prepared with ozokerite compound, have been made into the necessary cables. The tape used for the purpose is of a special class, and is first passed through a bath of compound and then cooled by passing through water. The compound consists of about three parts by weight of ozokerite to one part of Stockholm tar; it is kept heated in a boiler, and maintained at the lowest temperature at which it can be kept fluid; the water cools the prepared tape, and prevents it sticking on being wound off on to a bobbin. The wires are taped in the ordinary manner; gutta-percha wire thus treated is found to last in a very satisfactory manner. The quality of the ozokerite used by the Post Office is different to the harder sort mostly in use, being softer, and possessing somewhat different characteristics, it melts also at a lower temperature, somewhere about 156° Fahrenheit, and, as may be supposed, mixes thoroughly with the tar.

It will be seen, therefore, from what we have said, that this mineral or "earth-wax" is an important industry, and that a very large supply is in demand not only for our underground wires, but also for our electric light wires, for in their insulation and in their external preservation all cable and wire manufacturers use "ozokerite" very largely. It would be very difficult to supply its place for the manufacture of electric light wires, for whilst ozokerite has many of the qualities of paraffin wax, it has others which that material does not possess. The continuous supply of this material is therefore much to be desired, and the recent discoveries in the United States are consequently welcome.—*Electrical Review*.

HEMATITE AND THE SCOTCH BEARS.—The sudden drop in hematite during the past fortnight is attributed to the action of some Glasgow iron merchants who are under engagements to complete old contracts at low prices, and are, therefore, doing their best to bear prices to their benefit. There is no reason whatever that warrant holders should allow this, as the present prices are abnormally low for this class of iron. A fortnight ago, when it touched 82s. 6d., makers were complaining that they could not make it for the money in the face of scarcity of coke, and the advanced price of ore and wages. How much more possible is it for them to manufacture more cheaply now when coke is almost unobtainable, and ore shippers ask more for future deliveries? This movement of the "bears" has resulted in frightening weak men out of their warrants, but it has transpired that there are not many of this class, the bulk of the holders being stronger than the "bears" anticipated. The consequence is that prices are firmer, and under the present condition of affairs hematite is expected by impartial authorities to reach 95s. or 100s.

NATIVE WYOMING SOAP.

BY HERMAN WESTPHAL, PH. G.

THIS mineral, which is known locally under the name of "Native Wyoming Soap," occurs in the Blue Ridge, 20 miles west and south-west of Soudance, Wyoming Territory, at an elevation of about 5,000 feet.

It is found in two distinct forms. 1. The variety which occurs in sink holes, or in the neighbourhood of sink holes, probably, an area of several hundred acres. It forms a thick, very tenacious pasty mass, about the consistency of butter. Its colour is light yellowish grey. Taste slightly saline, clay-like. Odour argillaceous. Moistened between the fingers with a little water it feels like soap or some greasy substance, hence its name. This soapy feel is probably due to the extreme fineness of the silicates which it contains. In hot weather the edges of the sink holes become hard and brittle, and on some places show an efflorescence of fine crystals of magnesium sulphate.

These holes, which seem to be almost bottomless, at times become very annoying to the ranchers, as cattle frequently get into them, and unless discovered in time and pulled out are sure to perish, as it is impossible for them to free themselves.

2. The dry variety occurs underground in veins like coal. It is hard and dry, and looks very much like chalk; the colour is somewhat darker, varying from yellowish white to dirty greenish yellow. On addition of a little water, however, it is converted into the soft variety as found on the surface of the earth. It appears probable that the wet variety is formed by springs running over beds of dry soap, washing it up and in time accumulating it in large quantities.

It is used by cowboys and ranchers who live in the vicinity as a substitute for soap, and for removing grease by absorption. They also use it for making "hard water."

Five grams of the soap exposed to the atmosphere for several weeks, at a temperature of about 24° C. lost 41.20 % of moisture. It had become a very hard and brittle mass, varying from dirty white, greyish green to orange yellow. Taste and odour were unaltered; it adhered to the tongue, and when cut with a knife exhibited a very smooth and shining surface. On ignition the wet soap lost 53.30 %, while the air-dry soap lost 12.10 %, corresponding to 41.20 % on exposure. The air-dry soap reduced to an impalpable powder gave the following composition on analysis:—

	Per cent.
SiO ₂	61.08
Fe ₂ O ₃	3.91
Al ₂ O ₃	17.12
MnO.....	traces.
CaO.....	2.76
MgO.....	1.82
Na ₂ O.....	0.20
SO ₃	0.88
H ₂ O.....	12.10

Total 99.87

—*Am. Jour. Pharm.*

OLIVE OIL AND OLIVES.

POSSIBLY no food product was more extensively shown at the Paris Exhibition than olives and olive oil. In the French official catalogue 606 exhibitors of olive oil are specially named, besides numerous collective exhibits, and many others which are included under the general term "comestible" or edible oils; 448 of these exhibitors are from Portugal, 128 from California, and only 12 from France. One French exhibit, however, is made by 67 associated producers.

The Mediterranean has from time immemorial been the seat of the olive culture, and according to the *Journal of the Society of Arts* Spain has about 3,000,000 acres under olives, Italy 2,250,000, and France about 330,000. Tunis has over 4,000,000 trees, Algeria 3,000,000, Nice 1,000,000, where olive oil forms four-fifths of the agricultural produce, and Syria several million. The number of trees in other countries is unknown. Tuscany first exported olive oil, hence its old name "Florence oil."

Forty-five distinct species of the olive tree have been described, and in countries where it is indigenous the tree sometimes reaches a height of 60 feet with a trunk circumference of 12 feet. Besides the difference in the nature of the wood, foliage and habit of growth, there are large olives and small olives, pointed, oval, round and curved fruit, and of all colours, ranging from white to black and from green to red. The flavour of the fruit is mild, sharp, or bitter, and according to the variety there is obtained sweet oil light coloured and of exquisite flavour, up to dark green, thick and of a bitter taste, strong and very unpleasant to the taste. Hence it follows that olive oil may be perfectly pure and also quite unfit for food or culinary purposes, only suitable for greasing machines and making soap.

SUBSTITUTE FOR GUM ARABIC.

THE high price of gum acacia has led Trojanowsky to seek for a substitute, says an exchange, and this he believes may be found in the mucilage of flaxseed. By boiling the seed with water and precipitating the strained decoction with twice its volume of alcohol, he obtained a substance which, after drying, consisted of opaque, yellowish-brown irregular fragments, somewhat brittle, but not easily reduced to powder, dissolving in water to a turbid mucilaginous solution; of this, five grains were sufficient to emulsionize an ounce of cod liver oil. The large quantity of alcohol, however, required for the precipitation and the difficulty of drying the adhesive product being such serious objections, further experiments were made, and, by still employing flaxseed as the source of the mucilage, and treating with sulphuric acid, a gum more closely resembling acacia was obtained. His method is to boil one part of flaxseed with eight of dilute sulphuric acid and eight parts of water, until the mixture, which at first thickens, becomes quite fluid; this is then strained through muslin, and to the strained fluid is added four times its volume of strong alcohol, the precipitate being collected on a filter, washed with alcohol and dried. The gum is in the form of translucent, grayish-brown, brittle fragments, easily pulverized, and without odour or taste, and 30 grains will emulsionize an ounce of cod liver oil.

COPPER, LEAD, AND SELLER IN 1889.

IN its review of the metal markets for 1889, the *Engineering and Mining Journal* states that the prospects for the copper trade must be described as decidedly encouraging. It may be that consumption may not continue at its present enormous rate, but everything indicates a prosperous year for 1890. Some increase in production is probable from Montana and Michigan, but no anxiety need be felt in this respect, as the larger demand will absorb any likely increase. Neither need we now fear the spectre of the warehoused stocks, which exerted such a depressing influence on the market in the early part of 1889. Assuming that there is still piled up in warehouse in New York some 20,000 tons, it must not be forgotten that hardly one of the smelting works have any stocks whatever, and our more interested readers will be quite aware of the fact that often during the past ten years the Calumet and Hecla Company alone have held about as large a stock as that which is now held of lake copper by the foreign bankers in warehouse.

Altogether the indications favour a continuance of prices quite as high, if not higher, than those now ruling for the next year, and this prospect is certainly not diminished by the reports of a serious fire in the Anaconda mine, as to which reliable information cannot at present be obtained, but which must result in some reduction of output. Stocks have steadily declined, and at present the total stock of copper in this country is about 65,000,000 pounds.

While a very large part of this is held by the banks which took over the stocks of the old syndicate, yet quite an important quantity of this old stock is sold for export, and is only awaiting shipment.

Never before in the history of the trade have the mining companies had such light stocks, and were it not for the syndicate's accumulation the country would to-day be absolutely bare of copper, and a copper famine would be threatened.

The manufacture of electrolytic copper steadily increases, and in 1889 amounted to no less than 21,000,000 pounds, as compared with 17,000,000 pounds in 1888. The coming year will still further increase the present production.

COPPER PRODUCTION BY STATES.

	1888. Pounds.	1889. Pounds.	Long tons.
Lake Superior	86,584,124	86,000,000	38,393
Arizona	34,497,300	32,000,000	14,286
Montana	97,897,968	105,000,000	46,875
New Mexico	1,631,271	3,400,000	1,518
California	1,570,021	1,700,000	759
Colorado	3,300,000	3,000,000	1,339
Utah	2,131,047	2,400,000	1,071
All other sources	3,241,725	3,000,000	1,339
Domestic production ..	227,853,456	236,500,000	105,580
From imported ores ..	5,000,000	5,100,000	2,277
Total production	232,853,453	241,600,000	107,857
Stocks, beginn'g of year..	40,000,000	75,000,000	33,482
Available supply	272,853,456	316,600,000	141,337
Deduct exports in ore, matte, ingots	78,000,000	82,000,000	36,607
Consumption	119,853,453	169,600,000	75,714
Stocks on hand and of year	75,000,000	65,000,000	29,016

The consumption of lead for pipes used in protecting underground electric wires has assumed an enormous expansion, and the year closes with the smelters in full operation, and the market practically bare of the metal.

With regard to the general question of production and consumption, it would appear that these two factors now nearly balance each other, and there is reason to believe that of the heavy stocks accumulated during the reckless speculation of the previous year not more than 10,000 tons are left. Part of this is still the subject of litigation, and part is strongly held for higher prices. The production of lead in the United States during the last three years is shown in the following table:—

	Arizona and California.	Colorado.	Idaho and Mon- tana.	Mo., Kan. Ill. and Wiscon.
1887	1,000	63,000	27,000	28,000
1888	1,000	65,442	34,875	30,000
1889	1,500	70,000	30,000	34,000
	Nevada.	Utah.	Other States.	Total pro- duction.
1887	3,400	22,000	16,300	160,700
1888	2,400	22,283	30,000	186,000
1889	1,500	22,000	31,000	190,000

*Including 28,635 tons from Mexico.

*Including 19,000 tons imported in Mexican ores.

The consumption of spelter has steadily increased, and the greater part of such increase may be attributed to the great activity in the galvanizing trade, which has been in a very prosperous condition throughout the whole of the year. So large has been the demand that on several occasions during the year some of the galvanizing works have been compelled to shut down for a time for want of the necessary supplies of metal. Without doubt an increase in demand has also been attributed to the requirements for brass making, and the manufacture of sheets was also very good up to the last six weeks or so, when the prices for the manufactured article did not respond to the advance in raw material.

Although spelter prices in this country may now be regarded as at a moderately high level, they are still comparatively much lower than values now ruling in Europe, where this metal has been exceedingly scarce for some months past. Imports have now almost entirely ceased, and the total quantity of foreign spelter imported during the past year only amounted to about 800 tons, the whole of which was undoubtedly exported again in a manufactured state, by which means the duty originally paid would be returned again as "drawback." Unless all signs prove deceptive, the consumptive demand for spelter is likely to increase still further.

PRODUCTION OF SELLER IN THE UNITED STATES, 1882 TO 1889, INCLUSIVE, BY STATES.

Year.	Illinois.	Kansas.	Missouri.	Eastern and Southern States.
1882	18,201	7,366	2,500	5,698
1883	16,792	9,010	5,730	5,340
1884	17,594	7,859	5,230	7,861
1885	19,427	8,502	4,677	8,082
1886	21,077	8,932	5,870	6,762
1887	22,279	11,955	8,600	7,446
1888	22,445	10,442	13,465	9,561
1889	24,000	11,000	12,500	12,000

AMERICAN v. RUSSIAN KEROSENE.

U. S. Consul Pettus, in a recent report from China, gives the following regarding the consumption of oil in that country:—

One of the most striking features of recent customs returns is the immense and rapid growth in the import of Russian kerosene oil into this country. Indeed, judging by the leaps and bounds by which the new trade has advanced, one might, with reason, conclude that the American oil was giving way before that of the Muscovites. Brother Jonathan had surely needs bestir himself or the oil wells of Pennsylvania and other states will cease to supply this illuminant to the far East, as they have done for years past. It is not hard to explain the reason of the progress of Russian oil here. It is somewhat cheaper than its older rival, and its sources of production at Baku are simply unlimited. There is nothing a Chinaman appreciates more than being able to save the most trifling sum, and it is because of its being a trifle under the cost of American oil that Russian kerosene is finding such demand in Shanghai. The trade is not yet two years old, yet the stock of Russian kerosene held in Shanghai to-day is larger than the other. There are at present some 277,000 cases of Russian oil held here, against 185,000 of American. The prices ruling, as given in Mr. Bielfeld's last report, are somewhat about 1.37½ to 1.40 taels for Russian and 1.50 taels for American. The arrivals from January to July this year were about 225,000 cases Russian, against 353,000 cases American, or, roughly speaking, the American oil is represented by

cent. and the Russian by 40. These figures speak for themselves. Five steamers of different nationalities brought full cargoes of Russian oil from Batoum to Shanghai since the beginning of the year, and two more are on their way. The carrying capacity of the vessels is enormous, and most of them have been specially built for the trade. They fly almost every flag, but principally the German and Italian. The Italian steamer Palestro and the German steamer enfels, which arrived here during the past month, brought, respectively, 99,800 and 84,000 cases, the first named being consigned to Messrs. Jardine, Matheson, & Co., and the second to the China and an Trading Company. The Italian steamer's cargo was the biggest shipment of oil ever brought by any vessel to Shanghai. Looking back over previous customs returns, we find that the import of American oil has dropped from 5,995,710 gallons in the three months April, May, and June, 1886 (when, no doubt, there was an oil boom which many of our readers will remember, perhaps regretfully), to 1,857,200 gallons, or last return, while the Russian oil grew from nothing in 1887 to 50,440 gallons for the same period, according to the same authority. This quantity about half of the American and a third of the Russian is re-exported. The first attempt to place Russian oil in the local market was made early last year, Messrs. Jardine, Matheson, & Co. being the pioneers in the trade. They soon had imitators, and now there are two other large firms engaged in the business, and two others of the Russian oil are at present held daily. The Chinese, as they always are of innovations were at first distrustful, but the superiority of the article soon established its reputation, and the prices correspondingly improved. The principal, and, indeed, the only objection which the Chinese have to the Russian oil is the inferior workmanship of the cases, which give great trouble and entail heavy loss by leakage, while the American tins are very strong and well finished. We would be sorry to see the American trade crushed by its new rival, but we suppose that it is a contest of the survival of the fittest, or rather the cheapest, in this as in every other struggle in human affairs. We imagine, too, that with the present energetic governor of Formosa at the head of affairs we shall some day hear of the development of the oil deposits of that wonderful island, and the discovery of the petroleum wells in the interior of Formosa which Mr. Dodd made years ago will prove another source of revenue to His Excellency Liu Ming-Chuan. Mr. Charles Marvin, in that highly-interesting volume, "The Region of Eternal Fire," writing of the oil supply at Baku, which he terms "the real base of Russian operations against India," and, contrasting the resources of the Russian with those of the American oil supply, says that he saw 400 wells around Baku, all at different depths, and therefore apparently springing from independent reservoirs. Some of these wells varied in depth from 259 to 580 feet, while one well which had been worked for generations was only 70 feet below the surface. The famous Droobja fountain well, spouting oil 300 feet high at the rate of 2,000,000 gallons per diem, came from a depth of 574 feet, which shows the enormous natural forces which must have been at work below, while all around were small wells of 300 feet deep, throwing up their spouts of the valuable oil quite unaffected by the giant well of Droobja. Many of the pumpings had been worked from remote times without any apparent diminution of their resources. The whole peninsula of Apsheron is honey-combed with thousands of oil wells, one of which had given 1,500,000 barrels, and yet the pumps were drawing the oil as freely as when it was first tapped years ago. The wells in America are much deeper, and a man thinks nothing of boring 1,000 feet for oil, but 300 feet appears to be the average in the Baku region. In 1883 two flowing wells at Baku threw up 30,000,000 gallons apiece of oil in two months, and they were finally plugged to "cork up" for future use. Nobel Brothers, the Russian oil kings, and rivals of the Devoes, have 14 such gigantic reservoirs corked up, because the crude petroleum will not fetch more than a few pence a ton at Baku, and the deepest of these basins is only 800 feet from the surface, while in the Bradford region in America there are numbers of wells 2,000 or 3,000 feet deep, and one in West Virginia which is over 5,000 feet deep. The pipe line to Batoum, too, is what gives the Russian oil the great pull, while the American has nearly all to be sent, with consequent extra freight, to New York for refinement, whence it is almost exclusively shipped.

MANCHESTER SHIP CANAL.—To the purely commercial reader as well as to the skilled engineer there are divers ways of giving a true conception of the magnitude of the works at the Manchester Ship Canal. Mr. Leader Williams, the engineer of the great undertaking, is master of all the ways, and not least so of the way befitting a popular audience. Here is a quotation from that gentleman's lecture in the Salford Town Hall:—"There are 11,489 men and boys, 182 horses, 5,900 waggons, and 169 locomotives employed at the Canal works. There have been constructed 213 miles of temporary railway; and 10,000 tons of coal and 8,000 tons of Portland cement are used in the excavations each month."

NOTES FROM KUHLOW.

ARTIFICIAL MANURES.—The German agriculturists have not had the disadvantages of the convention among the artificial manure manufacturers brought home to them in an exceedingly unpleasant manner. One of the principal articles affected is Thomas slag, which a few years ago was regarded as hardly a valuable article, has, since being ground to a dust fineness, become a very valuable manure. To enable farmers to obtain the article at a moderate price the German Agricultural Society concluded a contract for three years with the Thomas meal manufacturers at the end of 1887. In accordance with this contract the price per 1000 kilos. of 20 per cent. stuff was 310 mks. at Peine. Since the expiration of the contract the price has rapidly risen. In the autumn of 1888 it stood at 380 mks., in the course of the present year it has advanced to 510 mks., and a further increase is said to be in prospect. To obtain increased prices the Thomas slag meal manufacturers during the summer sold some 50,000 tons abroad. Much lower prices had to be accepted for the foreign sales than what was received for the inland ones. It has been proved that in many cases the price of this 17 per cent. export article at the works was only 290 mks., and even 200 mks. per 1,000 kilos. For reasons readily comprehensible it was stipulated that the stuff should not be resold to Germany under penalty of a considerable sum. The manufacturers were thus selling their slag meal to foreign countries at abnormally low prices, seeking by this means to keep up the high prices in the home market. It is natural that German consumers should not regard this state of things with equanimity. In our last issue we mentioned that the persons interested in agriculture were about to adopt vigorous measures of self-defence. At the same time complaints are heard of the advance in the price of phosphoric acid, which result is equally to be attributed to the activity of a coalition of the manufacturers. At the last meeting of the Pomeranian Economical Society at Goeslin, it was shown that in the last year the price of that article had been forced up 80 per cent. The manager of a chemical works endeavoured to prove that the advance was justified by the increased cost of the raw materials and higher wages. Notwithstanding, the resistance against the operations of the manufacturers' coalition remained general. The advice was given to farmers to cease using the article or to restrict its quantity; it was further recommended to purchase phosphoric acid from England and Belgium, in which countries it is considerably cheaper. In such an event foreign competition will certainly be of advantage to German consumers. Attempts have, it is true, been made in the Reichstag to get a protective duty imposed upon artificial manures, but they have always failed. In the interests of a sound state of business it is to be hoped that the attempts of the artificial manure consumers to bring about reasonable prices will be attended with success.

THE IMPORT DUTY ON LUBRICATING MINERAL OILS.—A modification of the duty on lubricating mineral oils is advocated by the Leipzig Chamber of Commerce. This article came in duty free from 1865 to 1879, but after the latter year a duty of 6 mks. per 100 kilos. was imposed, and since 1885 the duty has been 10 mks. per 100 kilos. In passing a judgment upon the oil duties the Chamber of Commerce remarks—"Of what importance these oils are to the whole German industry is seen by the weight upon which duty is paid. In the last three years, notwithstanding the high duty, equalling 50 per cent. of the value, the quantities imported were 307,165, 226,354, and 330,115 dble. ctrs. In the reports received by us the production in the inland of these lubricating oils is described as extremely limited, and as hardly capable of increasing. The increase in the duty seems to have been of little benefit to the rape-seed oil, which is being more and more pressed by the mineral oils, because consumers believe that the latter merit the preference. The Russian lubricating oils are not only used as such, but they are also employed in printers' black manufactories, whereas for that purpose the native oils are not to be used, no matter how cheap they might be. The printers' black manufacturers, whose markets have seriously suffered through the increase in foreign duties, therefore earnestly desire a reduction in the duty on lubricating mineral oils." In the official trade statistics the average value of the lubricating mineral oils in 1888 is estimated at 18.50 mks. per 100 kilos. The existing duty is consequently considerably more than half the value of the article.

THE UPPER SILESIAN ZINC MARKET IN 1889.—The Upper Silesian zinc industry can look back with satisfaction on the second half of 1889. Prices steadily pursued an upward course, and every quantity brought into the market found an immediate purchaser. No such prices as are reached at present have been attained since 1841. The strike agitation exercised no serious influence on the Upper Silesian zinc industry. It was only in a few cases and for a short time that work was suspended in some of the works. At the whole of the works higher wages were conceded, representing an appreciable improvement in the wages conditions. The leading brand, W. H.,

commenced at the beginning of January with 18 mks., then rising to 25 mks., and was quoted at the end of February at 18.25 mks. For special brands stood at 17.70—17.90 mks. towards the end of February. In March, both actual buyers and speculators were very nervous, the tone consequently becoming weaker. After a fall of 75 pgs.—1 mk. the tendency again became firmer. W. H. was quoted at 17.90 mks., "Godulla" 16.70 mks., and the Vereinsmarke 17 mks. The upward direction then went steadily forward to the end of the year, business everywhere being very lively. During the last few months it was everywhere difficult to obtain goods for immediate delivery; the whole of the stocks were cleared out. The sales in the last few months of the year were almost all for 1890 delivery, and some works are even engaged for the second quarter of this year. At the close of the year "Godulla" was quoted at 23.65 mks., and W. H. at 24 mks. per 50 kilos free on rails Breslau; the latter brand could not be had. The advance above the lowest price during the year amounted to 7 mks. per 50 kilos. Twenty-three works were running.

At a meeting of the sixteen South German cement manufacturers, held at Frankfort-on-the-Maine, it was decided to increase the price by at least 35 pgs. per 50 kilos. The increase to come into force on the 1st of January.

KALI MARKET.—According to the report of the Sales Syndicate of the Kali works the deliveries of chloride of potassium in November amounted to 282,248 ctrs. (against 225,000 ctrs. in 1888). During the first half of this year the deliveries were 1,145,000 ctrs., and from the 1st of July to the end of November 1,149,000 ctrs., so that the whole of the December deliveries may be regarded as a surplus.

GERMAN SUGAR INDUSTRY.—The *Reichsanzeiger* publishes a preliminary review of the results of the beet sugar manufacture in the season 1889-90, from which it appears that in the German Empire up to the 1st of December, in 400 beet sugar manufactories, 65,050,467 dble. ctrs. of beet were consumed, yielding 9,921,516 dble. ctrs. full measure. Probably a further quantity of 30,732,806 dble. ctrs. beet will still be used, so that the total for the season would then be 95,783,273 dble. ctrs., against 78,961,830 dble. ctrs. last season.

PROBABLE ADVANCE IN THE PRICE OF TYPE METAL.—It is reported from type founding circles that in consequence of the enormous increase in the price of antimony, a very important metal in type production, caused by its recent large employment for military purposes, a considerable advance in the price of printing materials, will probably take place shortly. As a matter of fact the price of antimony has risen more than 100 per cent. in 10 months, and people in the branch are expecting a further heavy rise.

ADVANCE IN THE PRICE OF LIME.—The whole of the limekiln proprietors of Upper Silesia have intimated that from the 1st of January the prices will be increased as follows, unslacked piece lime to 44 pgs., fresh lime ash to 14 pgs. per 50 kilos. at Gogolin. The reason for this step is the considerably increased expenses for wages and coal. Should coal still further rise, the foregoing prices will be again increased. The difference in the carriage between Gogolin and other stations will be equalised by reducing the price when there is a higher carriage, and increasing it when the carriage is lower.

CEMENT PRICES.—The Portland Cement-fabrik Hemmoor has issued a circular in which it is stated that in consequence of the enduring and considerable rises in the price of all raw stuffs, especially coal, the company, like the other manufacturers, is compelled to advance its prices for Portland cement, more particularly in view of the lively demand for that article. In the first instance, by reason of some coal contracts that are still running, the advance will only be 25 pgs. (3d.), but very shortly it is to be increased to 50 pgs. (6d.) per cask of 180 kilos. or per two sacks of 85 kilos. each without packing.

CEMENT PRODUCTS.—Mr. A. Kutschbach, cement goods manufacturer, Eutritzscher Strasse, Leipsic, affords surprising evidence in his works of the progress attained in the application of cement for building purposes. As an imitation of sandstone, cement has made great progress, and this fact in itself is a sufficient evidence of its merits in this particular branch. The numerous new discoveries in the practical application of cement made in the factory in question deserve special attention. Among these may be mentioned the cement floor plates, which in their variegated colours testify to the progress made in colouring, and when perforated and rimmed are very valuable in works, breweries, paper mills and sidewalks. They are said to have a considerable sale. Mr. Kutschbach has opened out a new field in his imitation of Rochlitzer sandstone, and also in his coating-stone, which latter had previously been made of clay, and consequently did not by far possess the endurance of the cement stone.

THOMAS' PHOSPHATE MEAL.—In the latest number of a German agricultural periodical an appeal is made to the German Agricultural Society, under reference to a report of the Manure Section, in which German farms were requested to restrict their consumption of Thomas

meal in 1890, "in order thereby to put a stop to the increase of the price brought about by Thomas phosphate meal manufacturers," manure until "the Thomas phosphate meal price at present fixed by the convention of at Wanne, thus at 18—19 pgs." The abusers of Thomas' phosphate meal to the When the moral effect is taken into account which is signed by the leading German agent on the German and foreign consumption, it Hamburg paper, represent less than a fourth ctrs., so that the total diminution for 1890 will be half the production of 1889. Its movement is attended with prospects of success.

COKE PRODUCTION.—The prevailing high price has caused a great increase in the production, which is a reaction. In France many new coke works and many more are nearing their completion. Works that were stopped last year are now again in operation. New works are even being constructed in Germany. Thus, for instance, in the Rhine hundred and sixty new furnaces are being erected for the extraction of the accessory products. On all sides the newly constructed furnaces are producing the derivatives. This is a noteworthy point in the result. A slight difference is caused between coke on account of the reduced cost of the accessory product, sulphate of ammonia, and, further, a large and rapid expansion of the industry is thereby accomplished. The quantity in 1888 amounted to 122,785 tons, of which was won in the manufacture of coke.

LUTZEN.—The sugar manufactory here in Germany; no less than 10,000 ctrs. of beet beet in the course of last summer new diffusers were put in, and they have turned out excellently. It took half an hour to empty each diffuser, emptied instantaneously. Instead of the empty side, the new diffusers have openings at the top. When the 70 ctrs. of beet chippings in the vessel are got out the locks are opened, steam is directed to the vessel is immediately emptied.

HORSE-POWER.—With the dissemination of the term horse-power has come to be very largely employed, and is so frequent and general, very many people are ignorant of what the expression really means. That an engine requires a certain power or force is, however, according to the nature of the engine, a fact which is necessary to adopt a certain standard. This power is called horse-power. One horse-power is defined as the power which will raise 150 lbs. in 1 second 75 kilos. 6 metres high, or 6 kil. 18 metres high, or, putting it in the other way, a machine which requires 6 h.p. to be worked by a falling weight of 6×75 kilos.—45 second will have fallen exactly 1 metre. If the second be greater than 1 metre the weight must be raised in 1 second 75 kilos. 6 metres high, or 6 kil. 18 metres high, or, putting it in the other way, a machine is driven by a falling weight which in 1 second and weighs 75 kilos. or falls 18 metres with a weight of these performances would represent 6 h.p. of a man is reckoned at 13—18 kilogrammes the work required. In turning a wheel round six times as equalling 1 h.p. From this it will be perceived that the employment of mechanical power, even where horse force is required.

LOCH KATRINE WATER.—The monthly report of Loch Katrine water, prepared by Professor E. J. M. Glasgow and West of Scotland Technical College. The results are returned in parts per 100,000.—Total 2.7; organic carbon, .104; organic nitrogen, .003; ammonia, .000; total combined nitrogen, .003; chlorine, .75. Temperature, 60° C. = 42° F. Sampled on January 15th. It was light brown in colour with a little suspended matter. The temperature, hardness and organic matter are unusually high. The organic carbon is

Correspondence.

ANSWERS TO CORRESPONDENTS.

MANUFACTURES.—We are afraid we cannot help you.

D. C.—You must give us fuller information.

K. K.—We are glad to have your independent testimony to the value of the apparatus.

OZONE.—We shall probably have something to say about this before long.

DUBIOUS.—Your question is really too absurd for our serious consideration.

R. B.—You will find an account of it in a recent number of this journal.

J. M.—Your informant is wrong. There is a point above 40 per cent. anhydrous at which the fuming acid is liquid at the ordinary temperature.

NATURAL GAS IN INDIANA.

A TOUR through the Indiana gas belt and its pipe line cities and towns shows up several facts worth remembering. First, that the Indiana field is larger than any other yet discovered, and the area of territory fed from it is greater than that supplied from any other natural gas source. Second, judging from the location of the field, the lower initial pressure of the gas and slower consumption of the supply, it is likely to last longer than any other gas territory thus far found. Third, comparing it with any other field thus far developed, it has brought more wealth, a larger access of population and greater comfort and convenience to this commonwealth than have come to all the other states in the union combined from the finding of natural gas inside or outside of their borders.

Four hundred miles of pipe lines have been completed, including those supplying the city of Indianapolis from the Hamilton county field. Of the Indianapolis lines the Consumer's Trust, with the recent purchase of the Broad Ripple plant, has about seventy-four miles of pipe line, and with its 9,000 connections, supplies about thirty-five thousand people. Its pipe line includes thirty miles of eight-inch, fourteen miles of ten-inch, twelve miles of twelve-inch and eighteen miles of sixteen-inch pipe, and it has about one hundred and fifteen miles of street mains, varying from sixteen inches to three inches in diameter. The Indianapolis Natural Gas Company has thirty-five miles of pipe line, and with 5,000 connections, supplies 20,000 people. Its pipe line includes six miles of six-inch, eight miles of eight-inch and twenty-one miles of twelve-inch pipe, and its street mains extend over sixty miles. The two companies combined supply 55,000 domestic consumers at a saving over former coal bills of 250,000 dols. annually, and up to a comparatively recent period each supplied about one hundred and fifty factories and public buildings, with an annual saving over former coal bills of more than 100,000 dols. At this time the Consumers' Trust Company has shut off its factory supply for the winter. The other completed pipe lines in the state vary in length from five to forty-eight miles, and in diameter from two to twelve inches, the majority of them averaging eight inches. Upward of twenty cities and towns of the state, with an aggregate population of 260,000, are supplied with pipe line service, and if the cities and towns of the state supplied directly from the well are added, the list will be increased to seventy-one cities and towns, with an aggregate population of 411,000 in round numbers.

Placing the calculation on the basis that one-fourth of the population in cities and towns supplied with natural gas are consumers, it would give the State upwards of 100,000 municipal consumers, with an approximate annual saving over former fuel of 3,000,000 dols. The saving to manufacturers in the four cities of Muncie, Anderson, Marion, and Kokomo alone foots up 1,045,000 dols. a year, and if the savings of all the other State manufacturers using gas fuel did not exceed another million it would make up a total of 5,000,000 dols. a year as the amount of the saving effected by the new fuel to the people of the State, saying nothing about the increased comfort and incidental advantages which attend its use.

A good many explanations have been given concerning the difficulties found in forcing natural gas through long pipe lines, and many theories have been put forward based on atmospheric changes; heat, cold, etc. The latter have come to be rejected by practical operators who are engaged in the business. They say that neither heat nor cold in the atmosphere can affect the gas in the ground at the depth from which it is taken; that when moving through the pipe line it carries warmth sufficient to melt snow, if a hole be dug and the snow laid on the outside of the pipe in the coldest weather; and that even if the temperature of the gas were lower than the pipe line, the gas would only suffer a slight condensation that would make it move the faster. Initial pressure and friction in the pipe are the only factors admitted into the calculation.

When, by lengthening the pipe, enough friction is caused to overcome the initial or rock pressure at the first end of the pipe, no gas is delivered at the other end. When the pipe is shortened the gas is delivered at the farther end, with a pressure reduced in exact propor-

tion to the distance travelled and the resistance encountered from friction. Starting with 600 pounds pressure at Sheffield, gas is delivered at Buffalo, ninety miles distant, with a pressure of less than one hundred pounds. Starting with gas at 300 pounds pressure at Chesterfield, Ind., it gets to Richmond, Ind., forty-five miles away with less than one hundred pounds pressure. This is the argument the operators, briefly stated, and it looks reasonable. If our scheme of carrying Indiana natural gas to Chicago and Cincinnati is impossible, except through some device for pumping or forcing it, and this is not believed to be practicable.

CANADIAN OIL STATISTICS.

THE quantity of Canadian refined oil consumed in the Dominion of Canada is ascertained from the amount of Canadian refined oil inspected each month by the Inland Revenue Department at each of the different refineries in Canada, where the oil is manufactured, and as no refined oil can be offered for sale before it is inspected for safety, a perfect record of the consumption can therefore be obtained. The official returns for the first eleven months of last year are therefore as follows;—

1889.	Quantity inspected Gallons refined oil.	Crude equiv. in barrels.
January	729,452	52,003
February	737,523	52,644
March	605,963	43,583
April	361,082	25,792
May	451,142	32,224
June	487,233	33,953
July	633,886	45,278
August	649,604	46,400
September	1,361,069	97,219
October	1,311,752	93,696
November	1,153,476	82,391

The total quantity of Canadian refined oil inspected from the 30th June to the 30th of June in each year by the Inland Revenue Department since 30th June, 1881, and therefore consumed by the people was as follows:—

	Gallons.	Crude equiv.
1882	6,169,353	440,668
1883	7,135,580	509,684
1884	7,836,949	559,782
1885	7,843,043	560,217
1886	8,351,203	595,800
1887	8,436,938	602,638
1888	9,769,265	697,805
1889	9,684,336	691,738

The total quantity of Canadian and American refined oil consumed in Canada each year from 1882 to 1889 has been as follows:—

	Can. oil.	American oil.	Total.
1882	6,109,353	3,026,186	9,195,539
1883	7,135,589	3,088,414	10,223,994
1884	7,836,949	3,148,920	10,985,869
1885	7,843,033	3,813,379	11,656,412
1886	8,341,203	3,803,724	12,144,927
1887	8,436,938	4,309,397	12,746,335
1888	9,769,265	4,493,924	14,263,189
1889	9,684,336	4,723,698	14,408,034

By the above return it will be seen that there is a steady increase in the consumption of American oil in Canada. Last year the consumption of American oil increased, while that of the Canadian product decreased. America furnishes two-thirds of the total consumption in Canada.

The shipments for 1889 of crude and refined oil over the Grand Trunk and the Michigan Central railways, together with the crude equivalent, are as follows;—

GRAND TRUNK.

	Crude.	Refined.	Crude equivalent.
January	9,035	8,508	34,479
February	8,155	7,333	32,904
March	10,080	6,048	26,849
April	7,939	5,427	24,608
May	8,946	8,007	28,963
June	11,470	8,788	33,440
July	9,900	9,064	32,560
August	7,240	11,011	34,767
September	11,326	19,881	56,528
October	21,272	21,177	81,715
November	17,380	17,888	62,109
December	26,652	18,800	73,552

MICHIGAN CENTRAL.

January	3,420	4,637	17,451
February	3,810	5,268	19,644
March	5,110	4,175	16,955
April	3,820	3,163	9,716
May	3,815	3,620	12,865
June	3,810	6,215	19,347
July	4,690	5,210	17,715
August	5,392	6,240	20,992
September	4,821	8,239	25,518
October	4,415	9,195	27,403
November	5,406	10,620	31,959
December	2,550	8,595	23,037

TOTAL.

January	12,455	13,145	51,930
February	11,905	12,601	52,545
March	15,190	10,223	43,745
April	11,759	8,590	25,324
May	12,761	11,627	32,828
June	15,280	15,003	33,787
July	11,590	14,274	45,275
August	12,632	17,251	46,759
September	19,147	28,120	98,046
October	25,687	33,372	93,059
November	22,795	28,508	83,064
December	29,212	26,995	96,689

The *Petrolia Advertiser*, a journal specially devoted to the Canadian oil interests, in commenting upon the increased consumption of American oil in Canada, says:—"We have been asked by some of our readers to publish again our views about the flash test of our oil, in order to bring the matter prominently before both the crude and refined oil interest of this place as such a change, we think would materially benefit the oil interest of Canada, and we invite discussion on the subject so as to bring out the views of the intelligent thinkers who understand this question. Some people think the gravity clause ought to be expunged from the Petroleum Act, so as to enable the refiners to put any quality of oil they like on the market so long as it is safe, but we hardly think this would satisfy the crude oil interest, as the Canadian public would be more than ever disgusted with bad Canadian oil and not buy it at all. Others think the gravity should be made 790 so as to compel the refiners to make good oil equal to American, and use up our surplus crude. Some of our refiners say that a large quantity of 790 Canadian oil is now being manufactured by them and sold on the Canadian market in competition with American oil, and that it gives just as good satisfaction to those who use it as the best American oil. We think, however, that the flash test of our oil in Canada is too high, even higher than in any other country in the world, 95° by the Abel instrument is our test, and it is laughed at by experts who think that 73° oil is safe enough, which is the test by the same instrument in England. We do not agree with this English test as we do not think it suitable for our climate, but we think that 85° or 90° would be perfectly safe, and this would enable us to get more of the light burning percentage out of our Canadian crude oil to compete with the high class of American oil coming into this country. At present we only get 7 gallons of 790 refined oil out of a barrel of 35 gallons of crude, imperial measure, which is fit to compete with the best American oil of the finest quality, and it is thought that if the flash test was reduced to 88° or 90° we could get 9 gallons refined out of a barrel of crude, of a quality as good as the best American oil, and that the importation of American oil would be reduced proportionally, and in consequence this would give a greater demand for our crude oil.

THE MINING MANUAL FOR 1889-90, BY WALTER R. SKINNER. [London: 4, Birch Lane.]—The third annual publication of this useful manual testifies, by its bulk and fulness of detail, to the great growth of activity in mining enterprise, as well as to the industry of the editor. It acquires additional importance in the eyes of investors, just now from the recent establishment of the Mining Exchange, which promises to give to transactions in mining securities equal facilities and the same regularity as are afforded for the sale and purchase of ordinary stocks and shares on the Stock Exchange. Some idea of the expansion of mining enterprise last year, more particularly in the department of South African mines, may be formed from the fact that whereas in 1887 there were 830 companies, with 84 millions of capital, and in 1888 1,296 companies with 123 millions of capital, the record for 1899 amounts to 1,527 companies with 157 millions of capital. Hence the increase of over eighty pages in the present issue of the manual. A copy of the charter of the British South Africa Company, which is given at the end of the book, will be found useful for reference, and the list of mining directors will be almost indispensable to investors in mining undertakings.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish, or Italian.

Trade Notes.

OUR INDUSTRIAL CELEBRITIES.—We are requested to state that the memoir of the late Mr. Peter Spence, that recently appeared in our columns, has been reprinted in pamphlet form; various additional facts of interest having been embodied in it by Mr. Frank Spence (Manchester Alum Works, Manchester), who will be pleased to forward a copy to anyone desirous of having it.

ELECTRICITY FOR LONDON TRAMWAYS.—The London Tramway Company have introduced a bill which was considered by Mr. Campion, examiner for private bills, yesterday, for the purpose of applying electricity as a motive power for their various systems of tramways, by means of wire ropes, chains, or other electrical apparatus placed underground.

ELECTRIC LAUNCHES ON THE THAMES.—Next season there will be 24 electric launches on the Upper Thames, and in a few years steam launches will be extinct. An electric launch dispenses with boiler, furnace, and engines, which take up so much room on steam launches. No stoker or engineer is needed. The charged motors are laid along the keel beneath the flooring of the hold, and the launch need not slow up for 60 miles, and then it can replenish its storage batteries at one of the many stations en route. The largest electric ship on the Upper Thames is the Viscountess Bury. It cost £2,000, is 65 feet long, carries 60 passengers, and can be hired at 60 guineas a week.

THE tallest smoke-stack in the United States, and, in fact, says the *Boston Globe*, the tallest in the world designed solely for the purpose of providing a draught for boilers, is receiving its final courses in Fall River, Mass. It is intended to meet the requirements of the entire steam plant of the four new mills of the Fall River Iron Company. Some idea of its size can be had from the following figures, furnished by the contractor. From the top of the granite foundation to the cap is 350 ft., the diameter at the base is 30 ft., at the top 21 ft., the flue is 11 ft. throughout, and the entire structure rests on a solid granite foundation 55 ft. by 30 ft., 16 ft. deep. In its construction there were used 1,700,000 bricks, 2,000 tons of stone, 2,000 barrels of mortar, 1,000 loads of sand, 1,000 barrels of Portland cement, and the estimated cost is 40,000 dols. It is arranged for two flues 9 ft. 6 in. by 6 ft., connecting with forty boilers, which are to be run in connection with four triple expansion engines of 1,350 horse power each.

ELECTRICITY IN STREET LIGHTING.—The Newcastle Corporation's lighting committee will not carry out their implied threat of lighting the street lamps by means of electricity, for they have agreed with the Gas Company, and renewed the contract. Nevertheless, they mean to try electric lighting on a small and experimental scale. They propose to put the new light into the big lamps in the large open spaces at the top of Westgate Hill, the Central Station, the Cattle Market, and Barras Bridge. This experiment ought to yield satisfactory results.

OTTO OF ROSE.—The St. Petersburg ladies are complaining of the costliness of absolutely pure otto (or attar, as they call it) of rose. But may they not consider themselves happy if they can get it pure at any price. The best authorities say that there is no such thing as pure otto of rose imported into Britain. It is always adulterated, mostly with Indian oil of geranium, otherwise known as Rusa oil and oil of ginger-grass. It takes 20,000 roses (*Rosa damascena*) to yield otto of rose equal in weight to a two-shilling piece.

ANOTHER REFINERY NUISANCE.—Richard R. Quay, acting for himself and others, made information before Squire Singleton, of Beaver, against Jesse Dubbs, manager of the Gas City Oil Works, charging him with maintaining a common nuisance. The works are located on the Cleveland and Pittsburgh-road, near the residence of Senator Quay, and the complaint is made that the stench arising therefrom is unbearable.

FREE ALCOHOL IN GERMANY.—An order has just been issued by which German soap-makers are allowed to use alcohol in their manufactures free of duty, provided they conform to certain regulations. These rules, says the *Chemist and Druggist*, are very simple, and consist simply in the manufacturer giving notice on an official form of the quantity of spirit which he intends to use, and the time when the manufacturing process is to take place. The alcohol is then forwarded to the works in bond, and in officially sealed packages, and at the appointed hour an excise officer attends at the works, breaks the seal, and watches the incorporation of the alcohol into the soap stock until the spirit has been fully mixed with the caustic soda lye. The concession has been made specially in the interests of the manufacturers of transparent toilet soaps. For the manufacture of perfumery with duty-free alcohol facilities are already given.

BREAKING AWAY FROM THE CONTINENTAL.—On the 12th inst. the Florence Oil and Refining Company, of Florence, Col., cut loose from the Continental Oil Company, so says the *Refiner* of that place. It seems that several years ago the refiners of Florence entered into an agreement whereby the Continental agreed to take all the refined oil produced by the other companies at a price which allowed a small profit to those companies. This arrangement worked well enough while the supply was limited, but during the last eighteen months the supply has greatly increased, and the Continental has failed to take the oil from the companies as they produced it, because, the *Refiner* says, "neither the Continental or Standard wish to see the Colorado oil industry become of so much importance as to rival their own industry in the East, from whence is brought millions of gallons of oil each year to supply territory which belongs to Colorado." The Florence Company has secured a line of tank cars, and with fair treatment from the railroads will ship oil as far east as Omaha and Kansas City, south to Galveston and into Old Mexico, north to the British possessions and west to the Pacific coast.

A NEW OUTLET FOR COPPER.—E. A. Pontifex, chairman of the famous Cape Copper Company, in an address to the stockholders called attention in the following words to a matter of the greatest interest to the copper trade. Said he: There is one new outlet for copper, which, in addition to the large use of the metal for electrical purposes, promises to be a very important feature. I allude to its use in the form of sulphate of copper in vine culture. It has been found to be the only panacea for the phylloxera. We have ourselves, together with our friends of the Briton Ferry Copper Company, erected works capable of turning out a large quantity of sulphate of copper. The sales which we have already effected for present and future delivery will absorb 1,000 tons of the metal, and we have advices from France that works are in course of construction there capable of turning out 40,000 tons of sulphate of copper annually, which is equivalent to using up 10,000 tons of copper a year. And it must be remembered that copper thus used is lost for ever. It does not return to the maker as old copper for manufacture, with only some 8 or 10 per cent. of waste, as copper does which has been used for locomotive-plates or boiling-pans, or even pots and kettles. An increased consumption of over 10,000 tons a year for this one purpose—in addition to its use in the ever-swelling volume of trade and manufactures—must go a long way toward absorbing the greater output which higher prices may stimulate. I think, therefore, that we may fairly look forward to better prices than ruled before the French combination entered upon their disastrous campaign, and I am in a measure confirmed in this hope by the very prosperous condition of the iron trade, for it is an axiom with metal merchants and miners that iron carries nearly all other metals up with it.

Market Reports.

THE LIVERPOOL MINERAL MARKET.

The improvement reported in our market last week has been more than maintained. Manganese: Arrivals are nil, whilst stocks have been very much drawn upon, and prices are firmer. *Pyrites*: Raw lump without alteration, raw ground, £6. 10s., and *alcined* ground, £10. to £11. Bauxite (Irish Hill brand): The demand keeps more than pace with production, and prices are very firm. Lump done at 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have been small, whilst stocks have been further drawn upon, and prices are firmer, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate unchanged; best lump, 35s. 6d.; good medium, 30s.; medium 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Putnecstone is unaltered; ground at £10., and specially selected lump, finest quality, £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 14s. to 18s. Purple ore, 12s. 6d. Spanish manganiferous ore commands ready sale at full prices. Emery-stone: Best brands rather scarce, and bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda and tungsten metal more inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore inquired for, especially the higher grades. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore dearer on account of the suspension of the production through strike; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native) £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand sought after, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore more inquired for—22s. to 25s. Plumbago: More offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese sells readily at higher figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	60/4	....	56 1/2
Tin.....	£94 0 0	....	£94 0 0
Copper.....	48 17 6	....	48 17 6
Spelter.....	24 10 0	....	24 2 0
Lead.....	13 10 0	....	13 0 0
Silver.....	44 3/8	....	44 1/2

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto.....	16 1/8 16 1/2	....	16 1/8 16 1/8
Mason & Barry....	6 1/8 6 1/8	....	6 1/8 6 1/8
Tharsis.....	4 3/8 4 3/8	....	4 3/8 4 3/8
Cape Copper Co. ..	3 1/8 3 1/8	....	3 1/8 3 1/8
Namaqua.....	2 1/8 2 1/8	....	2 1/8 2 1/8
Copiapu.....	2 1/8 2 1/8	....	2 1/8 2 1/8
Panulcillo.....	1 1/8 1 1/8	....	1 1/8 1 1/8
New Quebrada....	7/8 1	....	7/8 1 1/8
Libiola.....	3 1/2 3 1/2	....	3 1/8 3 1/8
Tocopilla.....	1/9 2/3	....	1/9 2/3
Argentella.....	6d. 1/-	....	6d. 1/-

REPORT OF MANURE MATERIAL.

The demand for mineral phosphates continues, there being very little stuff available near at hand to satisfy it, but there has been less doing in all other kinds of manure material, and for these prices on the week are somewhat in favour of buyers.

Charleston River Phosphate Rock is still quoted at 11d. per unit, but we do not hear of anything to be had even at that price near at hand or for early shipment. The syndicate movement in Carolina is still in progress, and meantime the raisers do not show much willingness to make contracts for shipment ahead.

There is a somewhat greater disposition to sell Somme description, but we have no alteration in values to note. Belgian continues as last quoted, and prices for Canadian must still be considered as nominally 1s. for 70%, 13½d. for 75%, and 15d. for 80%, 1½th rise, delivered Thames, Mersey, or Clyde, the shippers still refusing to commit themselves for the coming season's output.

Bones are easier in all positions, freights permitting shipments from different ports in the Mediterranean, and exchange leading shippers of East Indian to modify their recent quotations. For a day or two the market has been somewhat demoralized, but at the close it is firm, at £5. 7s. 6d. for crushed East Indian, and £5. 2s. 6d. for mixed; and £5. 5s. for good grinding bones, ex-quay Liverpool. Nearest value of River Plate cargoes we should consider to be £5. 10s., though 2s. 6d. per ton more is asked for December shipments.

There have been sales of East Indian bone meal at as low as £5. 5s. February and March shipment, but the market quickly recovered, and that price has since been refused for 1,000 tons in a line, £5. 7s. 6d. being the lowest that sellers will now entertain ex-ship Glasgow or Liverpool.

Nitrate of soda remains dull at 8s. 3d. per cwt. on the spot. Due cargoes might fetch a fraction over 8s. 3d., and November shipments are worth about 8s. 6d. There is very little demand in any position, buyers just taking what they require to meet their current needs.

We have no change to note in value of supers, though there is a good demand, price remaining at about 50s. per ton, in bulk, f.o.r. at works.

There have been sales of home prepared dried blood during the week on private terms. Nearest value is 11s. 6d. per unit, f.o.r. at works, which price would be accepted for River Plate now on the way and shortly due.

Manure manufacturers seem to be suspending further purchases, until they see their manufactured goods going out into the country.

MISCELLANEOUS CHEMICAL MARKET.

The prices of all products in the alkali trade continue firm and makers are amply supplied with orders for some time to come. Supplies of caustic soda are now more easily obtainable, but the current prices are firmly adhered to, viz., 70%, £7. 17s. 6d. to £8, and 60% £7. per ton f.o.b. The demand for soda ash continues brisk, and the tendency is rather to higher prices than otherwise. For soda crystals £2. 12s. 6d. to £2. 15s. are now the lowest figures, according to package, &c. Bleaching powder is in fairly good demand, and nearest value to-day f.o.r. makers' works is £5. 2s. 6d. per ton. Hardwood packages, f.o.b., firm at £5. 12s. 6d. per ton. Chlorate of potash, 5¼d. to 6d. per lb. Lump sulphur, £5. per ton. Vitriol, 145%, free from arsenic, is in demand at 29s. 6d. to 30s. Sulphate of copper still scarce and firm, £24. 10s. per ton. White powdered arsenic is dearer and selling at £13. net per ton at usual points. Acetates of lime unchanged in prices, but only a moderate amount of business passing at current rates. Acetic acids rather dearer. Yellow prussiate of potash advanced to 10¼d. per lb. Alum and sulphate of alumina are realising higher prices generally. Lead acetates and nitrate continue to be neglected, but prices are stationary. Aniline oil and salt are dearer, and there is more general inquiry now from those who require these products, and who missed the opportunity of covering when prices were low. Potash caustic and carbonate are in good demand and prices are firm. Sulphocyanides are more inquired for, and makers are now quoting advanced prices. Carbolic acid crystals and liquid show no signs of improvement at present.

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Demand quieter; prices unaltered. Ochres: Oxfordshire, 10s. to £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 8s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. mber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian d., £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 8d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, 10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

WEST OF SCOTLAND CH

Although as a rule holders' quotations keep give way, enquiry is not of satisfactory volume some stimulant. Sulphate of ammonia, as above the chemical list, here and elsewhere, has gone attentions of buyers, and as low as £11. 15s. been taken. Operators feel distinctly nonplussed to make of present unfavourable developments forward. Soda crystals are easier; there is caustics, and even in bleach, but the only unsubstantial rises are sal ammoniac and lubric having been put up 20s. and the other in some improved on late gains. The three local makers contrary to the general rule, have of late been for orders at combination prices, and this equal of soda also. The Scotch paper makers have to their men with a view to some basis of co-operation the future, so as to avoid mutually ruinous strikes considering just now how this novel proposal in a spirit of faith, or with suspicion. Chief Soda crystals, 48s. 6d. to 50s. net Tyne; alum i Glasgow; borax, English refined £30., and t net Glasgow; soda ash, 1¼d. less 2½% Tyne; £9. 70s., 70/72", £7. 17s. 6d., 60/62", £7 cream, £6. 15s., all less 2½% Liverpool; bica casks, £5., and 1 cwt. casks, £5. 5s. net 48/52", 1¼d., net Tyne; saltcake, 25s. 6d. to £5. 15s., less 5% f.o.r. Glasgow; bichromate soda 3d., less 5 and 6% to Scotch and English chlorate of potash, 4¼d., less 5% any port; sulphate of ammonia, £11. 15s. f.o.b. Leith; 2nd white, £37. and £35., less 2½% any po £24. 10s., less 5% Liverpool; paraffin scale, paraffin wax, 120°, semi-refined, 2¼d.; par 9d.; paraffin oil (burning), 6¼d. to 7d., (Gla ing), 865°, £5. 10s. to £6., 885°, £6. to £7. 10s. to £8. Week's imports of sugar at bags.

TAR AND AMMONIA PR

The benzol market remains without change, 90's benzol still finding a market at 4s., and 50 Crude naphtha 20% at 120° is fetching 1s. 2d. qualities at a corresponding increase. Crude continues unsatisfactory for the sellers, but the solvent naphtha is very good. The Anthracene out change, there being, apparently, a large supply on. Pitch is weak, and though 33s. 6d. may some cases on the East coast, and 32s. Garstor small, and purchasers seem to have covered the

The sulphate of ammonia market may be colder than last week, and, to a certain degree, price recover. To-day's value at Hull may certainly be and £11. 15s. to £11. 16s. 3d. at Leith. £, while outside London makes are rumoured that several brokers have large deliveries month, having considerably oversold themselves why such an effort has been made to "bear" the market. If sellers will only refer to the Exports they will be able to see that a considerable quantity of sulphate has been shipped during the week which does not accord well with the state of demand.

New Company

STANDARD PORTLAND CEMENT COMPANY, LIMITED of the Standard Portland Cement Company, in liquid form, with a capital of £100,000, divided into preference shares, 12,280 ordinary shares of £5. each, at par. The property of the company is situated at Basingstoke, known as the Barrington Cement, Brick, and Lime Works. The subscribers are:—

J. H. Smith, Wallington, Surrey
W. Morris, Hitchin
F. J. Lee Smith, Newlands Park, Sydenham
Col. A. Hamilton, 41, Lennox-gardens
G. Stanford, 17, Benland-road, Clapham, secretary
F. W. Toole, 34, St. Mary's-square, S.E., clerk
W. S. Park, 20, New North-road, secretary to
F. Hunter, 3, Vicarage-terrace, Leyton, private secretary

Gazette Notices.

PARTNERSHIPS DISSOLVED.

CHAPPELL AND CO., Heathfield, near Bovey Tracey, electric carbon manufacturers. HEY AND SMITH, Bradford, wholesale druggists and dyers.

Notices of Dividends.

LIVERSIDGE ELLIOT, Huddersfield, electric engineer. First dividend of £s. 50, February 3rd, Messrs. Haigh and Sons, New-street, Huddersfield.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Coating Surfaces with Paints. Kenneth Henry Cornish. 5. January 1.
Preventing Action of Water on Lead. James Smillie. 16. January 1.
Apparatus for Washing Ores.—(Complete Specification).—Robert Angus. 21. January 1.
Distilling Heavy Petroleum Oil. 27. A. M. Clark. January 1.
Electrical Coating of Metals. S. V. Dardier. 29. January 1.
Hydrocarbon Lights. F. W. S. Stokes. 34. January 1.
Manufacture of Raw Materials for Dyestuffs. R. J. Friwell. 39. January 1.
Decorating Wood. C. Hettwig and F. Heckner. 40. January 1.
Scoops for Charging Gas Retorts. S. J. Ball. 44. January 1.
Automatic Lubricator. J. McDonnell. 49. January 1.
Distillation of Coal or Shale. T. Parker. 67. January 2.
Separating Tin from other Metals. J. Bang and A. Ruffin. 70. January 2.
Manufacture of White Lead. G. Bischof. 71. January 2.
Supplying Vessels with Hydro-Carbons. R. Bruno. 72. January 2.
Steam Boilers. J. G. Williams. 83. January 2.
Oil Filler for Lamps and Stoves. E. Banfield. 91. January 3.
Electric Meters. W. Moseley. 119. January 3.
Burning Fuel Economically. W. Potts. 116. January 3.
Production of Azo Colouring Matters. R. J. Friwell and A. G. Green. 134. January 3.

Apparatus for Delivering Regular Quantities of Liquid. R. Bradbury and D. Winterbottom. 143. January 4.
Paraffin Lamps. J. G. Patterson. 151. January 4.
Feeding Furnaces with Fuel. J. W. Claridge. 156. January 4.
Hot Blast Fuel Heater. J. Judge and W. Dix. 163. January 4.
Drawing Metal Tubes. H. Luray. 176. January 4.
Steam Jet Pumps.—(Complete Specification). S. O. Johnson. 177. Jan. 4.
Separating Phenol from Creosote. P. Richm. 178. January 4.
Carbonizing Furnaces. J. Walker and W. Brown. 200. January 6.
Electro Motors and Dynamos. J. Hopkinson, E. Hopkinson, and G. A. Grindle. 222. January 6.
Extracting Gold from Quartz. R. Brown and G. H. Irvine. 237. Jan. 6.
Dynamos. W. F. King. 249. January 7.
Prevention of Choked Ascension Pipes. J. Stearns. 260. January 7.
Electro Magnetic Despatch Apparatus.—(Complete Specification). R. Hadden. 272. January 7.
Treatment of Ammonium Chloride, Ammonium Sulphate, and Calcium Chloride for obtaining Hydrochloric Acid. A. T. Smith, jun. 283. January 7.
Plates for Storage Batteries.—(Complete Specification). H. H. Lake. 290. January 7.
Secondary Batteries.—(Complete Specification). H. H. Lake. 303. Jan. 7.
Treatment of Sewage. 309. T. Kay. January 7.
Making Coal Gas in Vertical Retorts. W. T. Cotton and E. F. B. Crother. 343. January 8.
Electrodes for Batteries. L. Epstein. 350. January 8.
Dextrine. S. Wöhle, A. C. Irwin, and G. O. Jacob. 357. January 8.
Smoke Economiser. G. H. Hunt. 373. January 9.
Dyeing Yarn. J. B. Whiteley, E. Whiteley, and J. B. McKay. 375. January 9.
Manufacture of Nitrate of Potash. O. C. Townsend. 381. January 9.
Evaporation of Brine. R. C. Wilson. 393. January 9.
Evaporation of Liquids. W. Wild. 398. January 9.
Manufacture of Sulphate of Copper. H. J. E. Hennebutte. 421. Jan. 9.
Fixing Atmospheric Nitrogen. P. B. de Lambilly and E. L. Chabrier. 412. January 9.
Ore Concentrating Machinery. W. J. Smith. 424. January 9.
Improvements in the Manufacture of Alum. F. M. Spence, D. D. Spence, and A. Esilman. 443. January 10.
Treating Liquids and Solids with Gases. C. Blagburn. 474. Jan. 10.
Purifying Water. E. Devonshire. 480. January 10.
Primary Batteries. M. Sappey. 488. January 10.
Concentrating Liquids by Evaporation. T. E. Wilson. 510. January 11.
Separating Iron from Bones. F. Christy and J. H. Carter. 530. Jan. 11.
Gas Producers. W. C. Sellar. 552. January 11.
Manufacture of Copper. T. Troynam. 560. January 11.
Blue Colouring Matters. Kern and Sandoe. 569. January 11.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Jan. 11th.

Alkali—
Holland, 33 t. H. Wallace & Co.
France, 249 Arnati & Harrison
Antimony Ore—
Melbourne, 5 t. Knight & Morris
Portugal, 12 H. Emanuel
Acetic Acid—
Holland, 175 pkgs. Beresford & Co.
" 30 A. & M. Zimmermann
Arsenic—
Germany, 475 Williams, Farrey & Co.
Bones—
U.S., 16 t. H. A. Lane & Co.
N.S. Wales, 4½ Goad, Rigg & Co.
France, 70 Darling Bros.
N.S. Wales, 3 7 c. Dalgety & Co.
N. Zealand, 3 12 Johnson & Allsop
" 1½ Plack, Chandler & Co.
Germany, 10 W. M. Smith & Sons
Barium Chloride—
Holland, 490 Petri Bros.
Barytes—
Holland, 32 cks. O'Hara & Hoar
" 22 Prop. Scott's Whf.
" 44 W. Harrison & Co.
" 69 D. Storer & Sons
Boric Acid—
Italy, 49 pkgs. Howards & Son
" 9 J. Paddy & Co.
Caoutchouc—
France, 411 T. H. Lee
Madagascar, 3 t. 17 c. Kelble, Son & Co.
" 4 L. & I. D. Jt. Co.
" 7 Aschenheim & Fuhrken
Belgium, 1 D. C. Thomas & Sons
" 16 L. & I. D. Jt. Co.
" 10 Lewis & Pent
" 11 Arnold, Cloney & Co.

E. Africa, 17 Matheson & Co.
" 16 Clarke & Smith
Aden, 1 2 Anderson, Weber & Smith
E. Indies, 1 14 Clarke & Smith
" 1 10 F. Stahlschmidt & Co.
E. Africa, 10 Price, Boustead & Co.
Sta. Settlements, 1 t. L. & I. D. Jt. Co.
A. Turkey, 22 M. D. Co.
Germany, 4100 L. Mendinyer
Chemicals (otherwise undescribed)
Germany, 430 F. Stahlschmidt & Co.
Holland, 15 W. Harrison & Co.
Germany, 10 Carroll & Frost
Holland, 10 T. H. Lee
Germany, 33 L. & I. D. Jt. Co.
" 254 A. & M. Zimmermann
" 113 W. Burton & Sons
" 34 T. H. Lee
Holland, 100 A. & M. Zimmermann
Germany, 70
" 19 T. H. Lee
Caustic Potash—
Holland, 21 pkgs. Francis & Co.
France, 33 drms. J. Knight & Sons
" 22 pkgs. Northcott & Sons
Camphor—
Germany, 2 tubs. L. & I. D. Jt. Co.
Japan, 191 Beresford & Co.
" 79 Devitt & Hett
" 50 L. & I. D. Jt. Co.
Caustic Soda—
Holland, 27 c. Beresford & Co.
Cream Tartar—
France, 16 pkgs. E. W. Carling & Co.
Copper Regulus—
Sydney, 32 t. J. A. Drew
Dolomit—
Germany, 475 J. B. Orr & Co.

Dyestuffs—

Argols
Newcastle, 33 pkgs. Hoare, Wilson & Co.
Dyestuffs (otherwise undescribed)
Germany, 5 pkgs. H. Kohnstamm
Indigo
E. Indies, 60 cts. L. & I. D. Jt. Co.
" 79 Arbuthnot, Latham & Co.
" 7 A. Harvey
" 2 Parsons & Keith
" 24 Langstaff & Co.
" 16 F. Stahlschmidt & Co.
" 71 G. Dards
" 46 L. & I. D. Jt. Co.
" 41 Elkan & Co.
" 18 J. Forsey
" 8 H. Johnson & Sons
" 7 Walker, Munzie & Co.
" 39 T. H. Allan & Co.
" 4 Parsons & Keith
" 70 Patry & Pasteur
" 6 G. Dards
" 12 H. Grey, jun.
" 163 pkgs. T. Ronaldson & Co.
" 79 cts. L. & I. D. Jt. Co.
" 5 W. Brandt, Sons & Co.
" 5 Seton, Laing & Co.
" 3 Benecke, Souchay & Co.
" 47 Arbuthnot, Latham & Co.
" 30 A. Harvey
" 1 L. & I. D. Jt. Co.
" 10 Ernsthausen & Co.
" 30 L. & I. D. Jt. Co.
" 11 Langstaff & Co.
" 25 L. & I. D. Jt. Co.
Gambier
E. Indies, 14 pkgs. S. Barrow & Bro.
China, 501 L. & I. D. Jt. Co.
E. Indies, 1,074 Brinkmann & Co.
" 393 J. H. & G. Scovell
" 249 Beresford & Co.
" 315 L. & I. D. Jt. Co.

Yalonia

A. Turkey, 205 t. J. Graves
" 10 Baxter & Heare
" 200 A. & W. Nesbitt
" 100 J. Kitchen
" 68 16 c. Boucher, Mortimore & Co.
" 33 12 Beresford & Co.
Sumac
Italy, 500 pkgs. W. Shelcott
" 100 Union Lighterage Co.
Myrabolams
E. Indies, 217 pkgs. Beresford & Co.
" 560 Marshall & France
" 2,124 L. & I. D. Jt. Co.
Cutch
E. Indies, 11 pkgs. L. & I. D. Jt. Co.
Extracts
France, 123 pkgs. L. J. Levinstein & Sons
Holland, 71 Burt, Boulton & Co.
France, 40 Prop. Chmblin's Wf.
Orchella
24 pkgs. N. Smith
Cochineal
Canaries, 16 pkgs. A. Levy & Co.
" 18 Marshall & France
" 8 Berrio & Co.
" 6 Johnson, Rolls & Co.
" 1 Kuhner, Hendschel & Co.
Tanners' Bark
Belgium, 50 t. J. Kitchen
" 14 S. Barrow & Bro.
" 13 Bevington & Sons
Cape, 12½ A. & W. Nesbitt
Dextrine—
A. Turkey, 445 Anderson, Weber & Co.
France, 4160 R. Warner & Co.
Gutta Percha—
E. Indies, 3 t. 10 c. L. & I. D. Jt. Co.
" 16 7 Kaltenbach & Schmitz
Germany, 9 9
E. Indies, 14 10 J. H. & G. Scovell

Glucose—		
Germany, 200 pkgs.	200 c.	J. Cooper
" 200	200	Fellows, Morton & Co.
" 35	283	Proprs. Chamberlain's Wf.
" 270	280	M. D. Co.
" 50	50	Hyde, Nash & Co.
" 100	100	Barrett, Tagant & Co.
U.S. 500	500	Francis & Co. Co.
Germany, 100	890	L. & I. D. Jt.
" 25	270	J. Knill & Co.
U.S. 600	600	Humphery & Co.
" 600	600	A. Dawson & Co.
Germany, 200	200	J. F. Ohlmann
" 100	200	T. M. Duche & Sons
" 200	100	Fellows, Morton & Co.
" 400	400	J. Barber & Co.
" 24	215	Andersen, Becker & Co.
" 21	180	C. Tennant, Sons & Co.
" 25	200	Fellows, Morton & Co.
" 25	129	Proprs. Scott's Wf.
" 100	150	H. A. Litchfield & Co.
" 200	200	Becker & Ulrich
" 25	200	P. Windmuller
" 37	350	J. Cooper
" 160	160	C. Tennant, Sons & Co.
France, 100	100	J. Barber & Co.
Glycerine—		
Germany, 86		Craven & Co.
" 120		G. Haller & Co.
" 35		A. & M. Zimmermann
Isinglass—		
Sta. Settlements, 2 pkgs.		Hale & Son
B. Guiana, 1 pkgs.		W. Baird & Co.
E. Indies, 10		L. & I. D. Jt. Co.
" 34		Clarke & Smith
Aden, 7		L. & I. D. Jt. Co.
China, 5		W. M. Smith & Sons
B. W. I., 1		Hale & Son
E. Indies, 12		J. P. Alpe & Co.
Sta. Settlements, 26 pkgs.		L. & I. D. Jt. Co.
Manure—		
Phosphate Rock		
863 t.		Lawes Manure Co.
140		T. Farmer & Co.
Manganese Ore—		
N. Zealand, 4 t.		L. & I. D. Jt. Co.
Naphtha—		
Holland, 190 brls.		Stein Bros.
Belgium, 10		Domeier & Co.
Potassium Carbonate—		
Holland, 11 pkgs.		Francis & Co.
" 6		Charles & Fox
Potassium Muriate—		
Holland, 10		H. Johnson & Son
Plumbago—		
Holland, 32 cf.		J. Barber & Co.
Germany, 12 cks.		Baresford & Co.
Ceylon, 90		Prop. Chamb. Wf.
" 50		Doulton & Co.
" 523		Thredder, Son & Co.
France, 4 cs.		A. Henry & Co.
Holland, 17 cks.		Brown & Elmslie
Ceylon, 97		Thredder, Son & Co.
" 20		H. Johnson & Sons
E. Indies, 43		L. & I. D. Jt. Co.
Pitch—		
Germany, 26 brl.		Berlandina Bros. & Co.
Italy, 30		"
Potassium Oxy Muriate—		
Belgium, 100 kgs.		G. Boor & Co.
Pyrites—		
Spain, 2,048 t.		C. Tennant, Sons & Co.
Paraffin Wax—		
U.S., 999 brls.		J. H. Usmar & Co.
Pearl Ash—		
France, 120 c.		F. W. Berk & Co.
" 100		Petri Bros.
Potassium Hydrate—		
France, 3 pkgs.		J. A. Reid
" 4		Spies Bros. & Co.
Quinine—		
Germany, 1,000		L. & I. D. Jt. Co.

Saltpetre—		
E. Indies, 953 bgs.		570 pkgs. C. Wimble & Co.
" 1,597		Clift, Nicholson & Co.
Germany, 58 pkgs.		Craven & Co.
E. Indies, 349		100 cks. L. & I. D. Jt. Co.
" 349		Tulloch & Co.
Germany, 35 cks.		P. Hecker & Co.
Stearine—		
Holland, 10 cks.		Perkins & Homer
Belgium, 112 bgs.		H. Hill & Sons
France, 150		G. Boor & Co.
" 148 sks.		J. Goddard & Co.
Salicylic Acid—		
Germany, 2 pkgs.		Burgoyne, Burbridge & Co.
Sodium Hyposulphite—		
Holland, 123		J. James
Sodium—		
Holland, 185		Beresford & Co.
Tartar—		
Italy, 39 pkgs.		Howards & Son
" 28		B. Jacob & Sons
Tartaric Acid—		
Germany, 2 pkgs.		L. & I. D. Jt. Co.
Italy, 80		Webb, Warter & Co.
Holland, 52		"
Germany, 12		Middleton & Co.
Holland, 2		W. C. Bacon & Co.
Tin Ore—		
France, 48 c.		Hughes, Chemery & Co.
Verdigris—		
France, 110		Webb, Warter & Co.
Ultramarine—		
Holland, 5 pkgs.		H. Peron & Co.
" 4 cks.		Spies, Brs. & Co.
" 4		Ohlenschlager Brs.
Germany, 40 cs.		G. Steinkoff
Zinc Oxide—		
Holland, 3 brls.		H. Lambert
Austria, 7 cks.		Braithwaite & Co.
Holland, 120		M. Ashby

LIVERPOOL.

Week ending Jan. 15th.

Albumen—		
Hamburg, 1 ck.		"
Bone Meal—		
Calcutta, 5,832 bgs.		"
Cream Tartar—		
Rotterdam, 22 cks.		"
Barcelona, 17 hds.		"
Moncofar, 4 cks.		"
" 5		Sachse & Klemm
Charcoal—		
Rouen, 100 bgs.		Co-op. W'sale Society
Copper Precipitate—		
Pomaron, 20,318 bgs.		Mason & Barry
Caoutchouc—		
Mussera, 2 cks.		Taylor, Laughland & Co.
" 5 bgs.		Samson & de Liagre
Ambrizette, 92		"
" 22 cks.		Taylor, Laughland & Co.
Landana, 1		Valle, Azevedo & Co.
Black Point, 8 brls.		1 ck. 2 cs. Pinto, Leite & Nephew
" 1 ck.		Edwards Bros.
Loango, 2 brls.		8 cks. R. W. Roulston
N'gore, 9 cks.		J. Holt & Co.
Cape Lopez, 26		A. V. Heyder
Gaboon, 12		Daumas & Co.
" 7		J. Holt & Co.
" 3		"
Beta, 7		"
Adalah, 2 brls.		3 cks. F. & A. Swanzy
" 7 cks.		1 cs. J. P. Werner
" 1		Radcliffe & Durant
Accra, 7 cks.		F. & A. Swanzy
" 8		Hutton & Co.
" 73		J. P. Werner
" 9		Lane & Co.
" 3		Taylor, Laughland & Co.
" 3 cs.		12 cks. Fischer & Co.
Salt Pond, 4 brls.		Edwards Bros.
" 4		5 cs. Fletcher & Fraser
" 1		2 Havard & Co.
" 1		A. Reis
" 1		Radcliffe & Durant
" 2		Griffiths & Co.
" 1		"

Cape Coast, 2 brls.		F. & A. Swanzy
" 2		T. Crouch
" 22		File J. ser
" 5		Ihlers & Bell
" 1		C. L. Clare & Co.
" 1		R. Davies & Co.
" 9		Millerson & Co.
" 1		Hobson & Co.
" 4		Radcliffe & Durant
" 1 cs.		6 brls. Havard & Co.
" 1		2 Edwards Bros.
" 2		Tomlinson & Co.
" 2 cs.		24 brls.
Elmina, 3 cks.		F. & A. Swanzy
" 2 cs.		Radcliffe & Durant
Axim, 5 bgs.		Edwards Bros.
" 2		Pickering & Berthoud
Sierra Leone, 6 brls.		Millington & Co.
Isle de Lo, 235		Colin & Co.
Bathurst, 2 pkgs.		French & Co.
Dyestuffs—		
Orchella		
Colon, 13 bls.		M. Beausire
Bay Beach, 7 bgs.		"
Quittah, 7		"
Cochineal		
Grand Canary, 16 bgs.		Levy & Co.
Teneriffe, 15 bgs.		H. Pool
" 12		M. Proda
" 5		T. Taylor & Co.
Las Palmas, 60		Lathbury & Co.
Valonja		
Syra, 79 bgs.		C. G. Nicolaidis
Divi Divi		
Smyrna, 2 brls.		"
Sumac		
Barcelona, 100 bgs.		A. Ruffer & Sons
Argols		
Leghorn, 5 cks.		"
Indigo		
Calcutta, 29 chts.		2 bxs. J. S. Morgan & Co.
" 108		1 Baring Bros. & Co.
" 59		1 Amos, Keay Mfg. Co.
Myrabolams		
Bombay, 1 pol.		Okell & Owen
" 2,248 bgs.		D. Sassoon & Co.
" 1,334		W. & R. Graham & Co.
" 901		"
" 1,675		Betry, Craig & Co.

Glycerine—		
Rotterdam, 10 cks.		5 carboys.
Venice, 21		"
Glucose—		
Hamburg, 15 bgs.		87 cks.
Magnesia—		
Rotterdam, 64 cs.		"
Manganese—		
Poti, 1,450 t.		"
Potash—		
Rotterdam, 41 cks.		"
Rouen, 73		Co-op. Wls. Society
Pyrites—		
Huelva, 1,652 t.		Matheson & Co.
" 1,500		Feauford & Co.
Pitch—		
Rotterdam, 22 cks.		"
Phosphate Lime—		
Dieppe, 200 t.		Phosphate Guano Co.
Phosphates—		
Dieppe, 350 t.		Phosphate Guano Co.
Salt—		
Rotterdam, 12 t.		"
Saltpetre—		
Hamburg, 77 cks.		"
Sodium Nitrate—		
Caleta Buena, 6,353 bgs.		"
Tartaric Acid—		
Rotterdam, 2 cks.		"
Tinical—		
Calcutta, 205 bgs.		"
Tartar—		
Constantinople, 5 bgs.		"
Tureptine—		
Trieste, 2 brls.		"
Tar—		
New York, 233 brls.		"
Ultramarine—		
Rotterdam, 40 brls.		2 cks, 5 cs.
Zinc Ashes—		
Rotterdam, 16 cks.		"

TYNE.

Week ending Jan. 16th.

Alum Earth—		
Hamburg, 18 cks.		"
Glucose—		
Hamburg, 100 bgs.		24 cks.

G		
Week		
Boracic		
Leghorn		"
Barytes		
Rotterdam		"
Cream T		
Genoa		"
Dyestuff		
Extra		"
Antwerp		"
Alizar		"
Rotterdam		"
Gutta-pe		
Amsterdam		"
Guano—		
Huaniclo		"
Oxalic A		
Rotterdam		"
Pyrites—		
Huelva		"
Phosphat		
Antwerp		"
Charlesto		"
Sulphur—		
Antwerp		"
Catania		"
Salt—		
Rotterdam		"
Turpenti		
Savannah		"
Tartaric		
Rotterdam		"
Zinc Oxid		
Antwerp		"
New York		"
Rotterdam		"
Antwerp		"
Week		
Chemicals		
Rotterdam		"
Dyestuffs		
Alizar		"
Rotterdam		"
Dyestuf		
Boulogne		"
Glucose—		
Hamburg		"
Dunkirk		"
Calais		"
Potash—		
Dunkirk		"
Calais		"
Saltpetre		
Rotterdam		"
Hamburg		"
Sodium S		
Rotterdam		"
Sodium M		
Rotterdam		"
Zinc Oxid		
Antwerp		"
G		
Week		
Alumina		
Stettin		"
Acid—(oti		
Rotterdam		"
Bones—		
Gotenbu		"
Amsterdam		"
Bone Mes		
Bombay, 4		"
Barytes		
Antwerp, 1		"

Rotterdam , 35 brls. Hutchinson & Son	Cobalt Oxide —	Madder	Naphthol —
Bremen , 13 cks. T. W. Flint & Co.	Hamburg, 9 cs. G. Malcolm, & Son	Rotterdam, 4 cks. Hutchinson & Sons	Rotterdam, 5 brls. Wilson, Sons,
Chemicals (otherwise undescribed)	Dyestuffs —	" W. & C. L. Ringrose	Pitch —
Serice , 14 cks. Wilson, Sons, & Co.	Myrabolams		Alexandria, 102 cks. Wilson, S.
Antwerp , 25 pks. "	Bombay, 3,750 bgs. Wilson, Sons, & Co	Glucose —	Turpentine —
Danzik , 5 cks. "		Stettin, 50 cks. Wilson, Sons, & Co	Libau, 90 cks. Morley, Clarke,
Hamburg , 3 "	Allsarine	Rotterdam, 20 bgs. Hutchinson & Son	Tartaric Acid —
Bremen , 5 kgs. Veltmann & Co.	Rotterdam, 53 cks. W. & C. L. Ringrose	Hamburg, 46 cks. 20 bgs. Wilson, Sons, & Co.	Rotterdam, 12 cks. G. Lawson &
Carbon —	" 35 Hutchinson & Son	Manure —	Tar —
New York, 50 brls. Wilson, Sons, & Co.	" 22 1 cs. W. & C. L. Ringrose	Hamburg, 170 t. Wilson, Sons, & Co	Reval, 2 cks. R. G.

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.					
Week ending Jan. 11th.					
Ammonia Sulphate —		Copperas —		Tartaric Acid —	
Ghent, 40 t. £476		Alexandria, 5,050 lbs. £28		Algoa Bay, 1 cs. £19	
Penang, 1 13		Mogador, 4 t. 15 c. £13		Melbourne, 20 kegs. 5 cks. 179	
Cologne, 5 60		Carbolic Acid —		Rangoon, 2 cwt. 14	
Yokohama, 2 26		Algoa Bay, 2 c. £40		Brisbane, 3 c. 20	
Hamburg, 151 10 c. 3,027		Cape Town, 200 gals. 30		Sydney, 5 cks. 21 kegs. 113	
Arsenic —		Melbourne, 5 c. 7		Durban, 100 lbs. 12	
Lyttleton, 20 cks. £56		Yokohama, 4,000 lbs. 82		M. Video, 2 cks. 70	
Antwerp, 9 t. 15 cwt. 140		Caustic Potash —			
Napier, N. Z'land, 1 3 c. 18		Algoa Bay, 5½ c. £12			
Melbourne, 1 14		Disinfectants —			
Ammonia Carbonate —		Colombo, 4 cs. £25			
Adelaide, 14 c. £11		Sydney, 12 cs. 51			
Calcutta, 4 11		Guano —			
Melbourne, 1 t. 2 45		Penang, 500 t. £5,000			
Yokohama, 30 cs. 60		Jamaica, 25 250			
Acetic Acid —		Demerara, 75 825			
Canterbury, 15 cs. 2 cks. £42		Jersey, 50 519			
Launceston, 6 12		Manure —			
Melbourne, 12 cwt. 32		Penang, 475 t. £3,800			
Alum Cake —		Hamburg, 30 375			
Calcutta, 19 t. 18 c. £75		Jamaica, 25 t. 1 c. 64			
Antimony Sulphate —		Demerara, 50 500			
Philadelphia, 15 c. £63		Jersey, 102 779			
Ammonia —		Martinique, 287 11 1,200			
Rosario, 25 cs. £26		Valencia, 419 4 4,220			
Bisulphite of Lime —		E. London, 1 42			
Calcutta, 4 t. 12 c. £89		Oxalic Acid —			
Bisulphide of Carbon —		Reval, 5 t. 7 c. £160			
Cape Town, 20 t. 3 c. £240		Melbourne, 7 7			
M. Video, 12 cs. 15		Phosphorus —			
Rosario, 100 drs. £52		Oporto, 6 c. £40			
Boracic Acid —		Potassium Bichromate —			
Yokohama, 20 kegs. £38		Melbourne, 3 c. £6			
Melbourne, 1 t. 11 c. 64		Potassium Bicarbonate —			
Bluestone —		Philadelphia, 10 c. £14			
Hobart, 1 t. 17 c. £46		Potassium Chlorate —			
Chemicals (otherwise undescribed)		Yokohama, 400 kegs. £809			
Hamburg, 20 pks. £78		Potassium Cyanide —			
Natal, 9 cs. 53		Yokohama, 4 cs. £20			
Yokohama, 80 pks. 115 kegs. 631		Sheep Dip —			
Hiogo, 50 cs. 1,313		B. Ayres, 67 t. 17 c. £3,140			
Caustic Soda —		Natal, 3 8 140			
San Diego, 55 t. 19 c. £376		Algoa Bay, 1 5 70			
Auckland, 2 t. 20		Faulkland Is., 83 pks. 179			
Canterbury, 8 t. 2 c. 60		Natal, 100 92			
Algoa Bay, 1½ c. £15		Melbourne, 200 drs. 119			
Copper Sulphate —		Salommoniac —			
Libau, 2 cks. £11		Libau, 2 cks. £19			
Lisbon, 5 t. 115		Saccharum —			
Cream Tartar —		Sydney, 34 t. 2 c. £600			
Melbourne, 2 t. 10 c. £278		Sulphur —			
Canterbury, 5 28		Trinidad, 2 t. 16 c. £30			
Auckland, 5 28		E. London, 8 18 94			
Citric Acid —		Sodium Sulphate —			
Rotterdam, 1 t. 10 c. £215		Ghent, 105 t. £105			
Hamburg, 2 cks. 20 kegs. 212		Soda Crystals —			
Genoa, 1 t. 14 c. 217		Sydney, 10 t. 14 c. £20			
Durban, 1 8		Hong Kong, 10 t. 3 c. £27			
Odessa, 1 keg. 7		Saltpetre —			
Yokohama, 5 35		Rio Janeiro, 1 t. 9 c. £32			
Carbolic Solid —		Algoa Bay, 15 18			
Antwerp, 24 drs. £362		Oporto, 1 2 24			
Adelaide, 4 cs. 30		Santos, 1 5 27			
Yokohama, 30 cs. 188		Sulphuric Acid —			
		Algoa Bay, 25 cs. £17			
		Sulphur Di-oxide —			
		Melbourne, 4 cs. £48			
		Sodium Tartrate —			
		Adelaide, 100 drms. £23			
		Melbourne, 6½ c. £23			

Algoa Bay, 32 bxs. 15 cs.	
Alicante, 18 drms.	
Amsterdam, 105	
Antwerp, 34	
Bahia, 15	
Baltimore, 200	
Barcelona, 110	
Batoum, 200	
Beyrout, 8	
Bilbao, 100	
Boston, 400	
Cape Town, 5 bxs.	
Catania, 61	
Calcutta, 160	
Ceara, 30	
Chicago, 100	
Durban, 19	
Ferrol, 6 brls.	
Genoa, 382	
Havana, 50	
Kobe, 50	
La Guayra, 5	
Leghorn, 145	
Lisbon, 131	
Madeira, 2	
Melbourne, 163	
Madrid, 100	
Mexico, 100 kegs.	
Malaga, 15	
Nantes, 53	
New York, 749	
Pernambuco, 30	
Philadelphia, 25	
Piraeus, 4	
Port Natal, 10 bxs.	
Rotterdam, 6	
Rouen, 144	
Salonica, 4	
Santander, 10	
Seville, 100	
Valencia, 41	
Venice, 100	
Vigo, 20 brls.	
Yokohama, 450	
Copper Sulphate —	
Barcelona, 55 t. 1 c. 3 q. 1	
Bordeaux, 32 13 3	
Genoa, 14 1 2	
San Sebastian, 20	
Nantes, 30 3 1	
Ancona, 12 2 3	
Leghorn, 45 3 2	
Cape Town, 6 14 0	
Palma, 50 4	
Santos, 10	
Lima, 3 2	
Adelaide, 10	
Antwerp, 10 3 0	
Bilbao, 20 6 3	
Barcelona, 14 6 1	
Saigon, 1	
San Thomé, 1	
Singapore, 5 10	
Tarragona, 5 4 2	
Venice, 1 19 2	
Genoa, 1	
Leghorn, 10	
Melbourne, 2 10	
Bordeaux, 50 1 1	
Caustic Potash —	
Beyrout, 5 c.	
Antwerp, 1 t. 15	
Chemicals (otherwise undescribed)	
East London, 6 c. 1 q.	
Philadelphia, 1 t.	

Carbolic Acid —		
Rotterdam, 12 c.	£67	
Hamburg, 5 3 q.	36	
Gibraltar, 25		
Cobalt Oxide —		
Gijon, 1 c.	£45	
Charcoal —		
Hamburg, 45 t.	£225	
St. Nazaire, 16 15 c.	50	
Copperas —		
Talcahuano, 4 t. 8 c. 1 q.	£10	
Salaora, 4 0 2	8	
Disinfectants —		
Bombay, 6 t. 5 c.	£42	
Rio de Janeiro, 5 3 q.	14	
Epsom Salts —		
Rio de Janeiro, 200 kegs.		
Santos, 20 brls.		
Glucose —		
Malta, 40 bgs.		
Manure —		
Bordeaux, 200 t. 11 c. 2 q.	£779	
Genoa, 399 7 1	1,389	
Havre, 50 0 3	202	
Las Palmas, 1 10 2	19	
Grand Canary, 12 t.	99	
Magnesium Oxide —		
Shanghai, 12 c.	£8	
Magnesium Carbonate —		
Mexico, 8 c.	£18	
Oxalic Acid —		
Trieste, 14 c.	£20	
Pitch —		
Ancona, 1,647 t.		
Port de Bouc, 1,002 2 c.		
Sherbro, 5 brls.		
Potassium Bichromate —		
Barcelona, 11 t. 2 c.	£389	
Yokohama, 7 10 1 q.	254	
Seville, 4	7	
New York, 10 1	15	
Varna, 6 3	13	
Leghorn, 2	45	
Potassium Chlorate —		
Genoa, 2 t. 5 c.	£134	
Antwerp, 2	102	
Passages, 1 10	77	
Hamburg, 1 3	52	
Havana, 2	88	
Leghorn, 1 5	64	
Rotterdam, 10	21	
Kobe, 12 4	598	
Monte Video, 1	53	
Nagasaki, 1 5	61	
New York, 10	560	
Shanghai, 2 10	105	
Palermo, 1	47	
Gothenburg, 5	242	
Montreal, 10	20	
Naples, 1 10	70	
New York, 10	396	
Naples, 10	25	
Catania, 10	25	
Potassium Carbonate —		
Boston, 9 t.	£161	
Bombay, 1 13 c.	30	
Potassium Chromate —		
Havre, 2 t.	£60	
Genoa, 9 c. 1 q.	15	
Phosphorus —		
Bangkok, 1 q.	£8	
Vera Cruz, 3 3	40	
Salt —		
Adelaide, 8½ t.		
Akassa, 188		
Amsterdam, 247		
Antwerp, 400		
Baltimore, 100		
Boston, 325		
Buguma, 60		
Chicago, 65		
Gothenburg, 82		
Coquimbo, 91		
Drammen, 450		
East London, 62½		
Ghent, 120		
Isle de Los, 50		
Manaos, 19 13		
Moss, 450		
Newcastle, 100		
New York, 138		
Norfolk, 1,270		
Old Calabar, 100 10		
Opobo, 654 15		
Portland, M. 80		
Sodium Bicarbonate —		
Adelaide, 20 kgs.		
Brisbane, 30		
B. Ayres, 10 130 cks.		
Carthagena, 120		
Genoa, 9		
Hamburg, 44 brls.		

Melbourne, 57	50	
Monte Video, 50		
Newcastle, 50	196	
New York, 122		
Rotterdam, 60 4		
Rouen, 20		
Salonica, 20		
Santander, 23		
San Jose de Guatemala, 20 kgs.		
Sydney, 67 kgs. 50		
Trieste, 10		
Vera Cruz, 5 2 cks.		
Yokohama, 2,500		
Soda Ash —		
Adelaide, 42 brls.		
Baltimore, 141 cks. 420 tcs.		
Barcelona, 60		
Boca, 100		
Bombay, 18		
Boston, 202 cks. 1,408 bgs.		
B. Ayres, 23 brls.		
Buffalo, 60		
Calcutta, 5		
Callao, 30		
Ghent, 11		
Hamilton, 80 tcs.		
Havre, 17		
Madeira, 4		
Malta, 150 cks.		
Melbourne, 243 cks. 18 brls.		
Montreal, 50		
New York, 707 929 tcs.		
Naples, 65		
Piræus, 30 brls.		
Philadelphia, 290 tcs. 252 cks.		
Portland, 82		
Rio de Janeiro, 75 brls.		
Rotterdam, 545 t.		
San Francisco, 110 cks. 218 tcs.		
Santos, 30 brls.		
Smyrna, 155 50 bxs. 145 cks.		
Sydney, 101		
Valencia, 4 cks.		
Sodium Silicate —		
Barcelona, 10 cks.		
Genoa, 35 brls.		
Naples, 20		
Salonica, 8		
Soda Crystals —		
Boston, 280 brls.		
B. Ayres, 10 cks.		
Calcutta, 15		
Callao, 140		
New Orleans, 84		
New York, 140		
Philadelphia, 76		
St. Johns, Nfld., 60		
Sydney, 15 kegs.		
Saltcake —		
Philadelphia, 25 t. 7 c.	£48	
New York, 100 10 c.	217	
Sodium Nitrate —		
Shanghai, 5 t.	£45	
Trieste, 12 6 c. 1 q.	107	
Carthagena, 1 5 1	10	
Malaga, 10 0 1	87	
Salammoniac —		
Constantinople, 6 c.	£10	
Ghent, 18		
Samsoun, 7 1 q.	12	
Venice, 10	17	
Mexico, 8 3	16	
Genoa, 30 1	55	
Durazzo, 9	15	
Philadelphia, 5 t. 1 3	173	
Patras, 5 1	9	
Smyrna, 1	34	
Batoum, 11 1	30	
Syra, 3	5	
Ancona, 9 1	16	
Alexandria, 1 18	66	
Sulphur —		
Boston, 75 t. 2 c.	£318	
Barbadoes, 20 3 3 q.	6	
Sodium Borate —		
New York, 1 t. 3 c. 1 q.	£50	
Sheep Dip —		
Bahia Blanca, 18 t.	£945	
Sulphuric Acid —		
Para, 9 c.	£6	
Sodium Sulphate —		
Lisbon, 2 t. 14 c. 3 q.	£7	
Saltpetre —		
Callao, 1 t. 5 c.	£28	
Syra, 1 3 3 q.	27	
Tar —		
Cabinda, 10 cks.		
Gaboon, 15 brls.		
Loando, 10		
Sherbro, 10		
Tartaric Acid —		
Havana, 1 c.	£8	
Tin Oxymuriate —		
Rio Janeiro, 2 c. 2 q.	£9	

Waste Salt—

Oporbo, 181 t.	
Sherbro, 350	
Sierra Leone, 300	
Sinoe, 25	
Sydney, 500	

HULL.

Week ending Jan. 14th.

Bleaching Powder—

Drontheim, 31 cks.	
Danzig, 15	
Stettin, 19	

Bone Size—

Harlingen, 11 cks.	
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Chemicals (otherwise undescribed)

Antwerp, 45 cks.	
Boston, 50	
Christiania, 10 pks.	
Copenhagen, 5	
Drontheim, 10 pkgs.	
Danzig, 5 30	
Dunkirk, 173	
Ghent, 5	
Gothenburg, 13 cs. 40 pkgs.	
Hamburg, 71 7 6	
Konigsberg, 2 10 pks.	
Libau, 27 60	
New York, 100	
Rouen, 65	
Reval, 34	
Rotterdam, 46 14	
Stettin, 17 20 pkgs.	
Caustic Soda —	
Copenhagen, 40 drms.	
Drontheim, 34 drums.	
Dunkirk, 19	
Hango, 80 drms. 6 cks.	
Hamburg, 1 cs	
Libau, 250 drums.	
Reval, 100 cks.	
Dyestuffs (otherwise undescribed)	
Boston, 15 cks.	
Christiania, 1 keg.	
Hamburg, 2	
Konigsberg, 1	
Rotterdam, 46	
Manure —	
Copenhagen, 16 t.	
Esbjerg, 1,400 bgs.	
Ghent, 1,199	
Hamburg, 1,575	
Pitch —	
Antwerp, 474 t.	
Dunkirk, 75	
Slag —	
Danzig, 350 t.	
Stettin, 46	
Tar —	
Hamburg, 10 cks.	

GLASGOW.

Week ending Jan. 16th.

Ammonium Sulphate —		
Calcutta, 2 t. 10 c.	£32	
Trinidad, 224 15½	£2,646	
Ammonia —		
Trinidad, 452 c.	£258	
Ammonium Carbonate —		
Boston, 20 c.	£31	
Bones —		
Trinidad, 714 c.	£171	
Benzol —		
Rotterdam, 10 puns	£320	
Chemicals —		
Rangoon, 4 t. 16 c.	£50	
Caustic Soda —		
Dunedin, 199¾ c.	£99	
Copper Sulphate —		
Marseilles, 5 t. 11¼ c.	£105	
Dyestuffs —		
Sumac		
Dunedin, 35 c.	£23	
Manure —		
Trinidad, 162 t. 19¾ c.	£604	
Magnesium Chloride —		
Penang, 1	£25	
Potassium Sulphate —		
Trinidad, 84¼ c.	£31	
Pitch —		
Bordeaux, 720 t.	£1,080	
Calcutta, 28½	55	
Potassium Bichromate —		
Rotterdam, 12 cks.	£175	
Dunedin, 14¼ c. 8 lbs.	27	
Marseilles, 1 t. 17¼ c.	60	
Potassium Prussiate —		
Rotterdam, 4 cks.	£57	

Paraffin	
Oporto, 1	
Sulphuric	
Rangoon, 1	
Sodium B	
Rotterdam, 1	
Tartar Cr	
Dunedin, 1	
Tar —	
Cape Town, 1	
Natal, 1	
Turpentin	
Penang, 1	
Waste sal	
Bombay, 1	

Week ei

Ammonia	
Hamburg, 1	
Alum —	
Rotterdam, 1	
Aalborg, 1	
Alkali —	
Libau, 1	
Ammoniac	
Huelva, 1	
Bleaching	
Hamburg, 1	
Rotterdam, 1	
Libau, 1	
Antwerp, 1	
Caustic So	
Antwerp, 1	
Flint Grou	
Antwerp, 1	
Hydrochlo	
Huelva, 1	
Litharge	
Hamburg, 1	
Lisbon, 1	
Magnesia	
Hamburg, 1	
Naphthalin	
Antwerp, 1	
Potassium	
Hamburg, 1	
Libau, 1	
Antwerp, 1	
Pitch —	
Antwerp, 1	
Soda —	
Rotterdam, 1	
Horsens, 1	
Sodium Bi	
Malmo, 1	

G

Week

Bleaching	
Antwerp, 1	
Bone Size —	
Boulogne, 1	
Benzol —	
Rotterdam, 1	
Terneuzen, 1	
Chemicals	
Antwerp, 1	
Ghent, 1	
Hamburg, 1	
Rotterdam, 1	
Coal Produ	
Rotterdam, 1	
Dyestuffs	
Boulogne, 1	
Ghent, 1	
Manure —	
Boulogne, 1	
Hamburg, 1	
Pitch —	
Antwerp, 1	

GE

Week

Chemicals	
Antwerp, 1	
Dieppe, 1	
Coal Produ	
Antwerp, 1	
Dieppe, 24	

THURSDAY, JANUARY 30, 1890.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary

	£	s.	d.
Lime, Acetate (brown)	8	10	0
" " (grey)	14	0	0
Magnesium (ribbon and wire)	0	2	3
" Chloride (ex ship)	2	7	6
" Carbonate	1	17	6
" Hydrate	0	10	0
" Sulphate (Epsom Salts)	3	0	0
Manganese, Sulphate	18	0	0
" Borate (1st and 2nd)	60/-	&	42/6
" Ore, 70 %	4	5	0
Methylated Spirit, 61° O.P.	0	2	2
Naphtha (Wood), Solvent	0	3	9
" Miscible, 60° O.P.	0	4	0
Oils:—			
Cotton-seed.. .. .	22	0	0
Linseed	22	10	0
Lubricating, Scotch, 890°—895°	7	5	0
Petroleum, Russian	0	0	5½
" American	0	0	6
Potassium (metal)	0	3	10
" Bichromate	0	0	4
" Carbonate, 90% (ex ship)	18	5	0
" Chlorate	0	0	4¾
" Cyanide, 98%	0	2	0
" Hydrate (Caustic Potash) 80/85 %	23	0	0
" " (Caustic Potash) 75/80 %	21	15	0
" " (Caustic Potash) 70/75 %	20	15	0
" Nitrate (refined)	1	3	6
" Permanganate	4	5	0
" Prussiate Yellow	0	0	10½
" Sulphate, 90 %	9	10	0
" Muriate, 80 %	7	15	0
Silver (metal)	0	3	8½
" Nitrate	0	2	5½
Sodium (metal)	0	4	0
" Carb. (refined Soda-ash) 48 %	5	7	6
" " (Caustic Soda-ash) 48 %	4	7	6
" " (Carb. Soda-ash) 48 %	4	15	0
" " (Carb. Soda-ash) 58 %	5	12	6
" " (Soda Crystals)	2	13	6
" Acetate (ex-ship)	16	0	0
" Arseniate, 45 %	10	0	0
" Chlorate	0	0	6¾
" Borate (Borax)	29	10	0
" Bichromate	0	0	3
" Hydrate (77 % Caustic Soda)	9	10	0
" " (74 % Caustic Soda)	8	15	0
" " (70 % Caustic Soda)	7	17	6
" " (60 % Caustic Soda, white)	6	17	6
" " (60 % Caustic Soda, cream)	6	10	0
" Bicarbonate	5	0	0
" Hyposulphite	5	0	0
" Manganate, 25%	8	10	c
" Nitrate (95 % ex-ship Liverpool)	0	8	3
" Nitrite, 98 %	27	10	0
" Phosphate	15	15	0
" Prussiate	0	0	7¾
" Silicate (glass)	5	7	6
" " (liquid, 100° Tw.)	3	17	6
" Stannate, 40 %	2	0	0
" Sulphate (Salt-cake)	1	6	0
" " (Glauber's Salts)	1	10	0
" Sulphide	7	15	0
" Sulphite	5	5	0
Strontium Hydrate, 98 %	8	0	0
Sulphocyanide Ammonium, 95 %	0	0	7¾
" Barium, 95 %	0	0	5½
" Potassium	0	0	7¼
Sulphur (Flowers)	7	0	0
" (Roll Brimstone)	6	0	0
" Brimstone: Best Quality	4	17	6
Superphosphate of Lime (26 %)	2	10	0
Tallow	25	10	0
Tin (English Ingots)	99	0	0
" Crystals	0	0	6¾
Zinc (Spelter)	24	0	0
" Chloride (solution, 96° Tw.	6	0	0

THE CHEMICAL TRADE JOURNAL

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SATURDAY, FEBRUARY 8, 1890.

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning**.

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

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CENTRAL *versus* LOCAL ADMINISTRATION.

WE note with deep concern the Tuesday's meeting of the Manchester Society of Chemical Industry. After the perusal of papers by Mr. W. Younger, the subject of the Instruction Act was brought forward by the Owens College, and our attention, I think, was drawn to a meeting that appeared in the following *Guardian*, will be principally devoted to his utterances.

In the first place, we wish to remind you that we have all along withheld our cordial assent to the provisions of the Act and to the proposed modification, so far as this can be foreshadowed, that the measure was being hurried along, and allow its various details to be worked out and precision to render it permanently useful. Once passed, it would be a barrier to the reason of the finality that always attaches to a legal instrument.

But it is perfectly incomprehensible to us that Bailey's position should have remained unchanged last under the erroneous impressions of the meeting. Surely it is only in the things that a large and wealthy city like Manchester provide the wherewithal for its own education and enterprises, and should bear its part of extending the operations of any nation to districts less favoured in their resources, that trouble appears to be that the Science School of South Kensington intends to have a firm administration of the Act. To us this trouble is a blessing in disguise. We are far from seeing any evils attendant upon a centralisation for this is a fact only too patent to all. In this, that local management brings in its train an innumerable multitude of evils that the central administration comes insignificant in comparison. Local jealousies, and the various other local influences, would be so easy to recapitulate, would all parts in the misuse of the enormous sum-ratepayer would be invited to place at the disposal of the central administration avoids much of this. It is a thing though sometimes unfeeling. One might say that it is dealt out to all, and the interest of the feeble is the interpretation of the wants of the many.

But we were most concerned by the announcement of Bailey that he wiped his hands of any matter before the City Council. This we hope it does not mean that he will relinquish his cause of education, or withdraw his support from the cause to which he has rendered such service. Manchester is still in want of "more light" and "more encouragement" on the action of the parties if they force Dr. Bailey to pounce upon execution.

The Paper Makers' Column.

THE ELECTRIC DECOMPOSITION OF CHLORIDES IN SOLUTION.

MANY years ago the patent records told us how we might prepare caustic soda and chlorine from a solution of common salt by passing a current of electricity through it; but those were the days of primary batteries, when the cost of the electric current put all such decompositions out of the question. The improvements in dynamos during the last two decades have entirely altered the situation, though, in our opinion, the matter is still unsolved—yet the problem is becoming nearer of solution day by day.

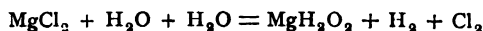
There are three steps by which practical electrolysis must be effected; the first is an economical supply of power; the second, an economical transformation of that power into electricity; and, thirdly, the discovery of practical methods of decomposition. The first step will probably be solved by the Hargreaves thermo-motor; the second may be regarded as practically solved, though students of electrolysis on the large scale will possibly prefer to blunder along making their own discoveries than to accept the results of contemporary workers.

It is the third step, however, which remains a fertile field for the inventor, and practical processes of decomposition are alone needed, as it is a well-known fact that nearly every chemical compound can be decomposed when sufficient electric force is applied to it. The decomposition of chemical compounds by this means demands very careful study and attention, as the results are liable to be influenced to a very large extent by small changes in the physical conditions, such as intensity of current, surface of electrodes and their distances asunder, the nature of the electrodes, and, perhaps most of all, the manner in which the electricity is applied.

We have now in our mind's eye two processes in practical operation, depending for their success upon the economical application of electricity. The Hermite process of electric bleaching is one that has been frequently alluded to in these columns, and depends upon the decomposition of magnesium chloride, while the other is the Webster process for the electric treatment of sewage, which doubtless owes its efficacy to the decomposition of the chlorides that all sewage contains. It is easy to show theoretically how, under one set of conditions, the process could end in nothing but failure, while under more favourable treatment success may follow, and, as an illustration, we offer a few remarks upon the electrical decomposition of a solution of magnesium chloride.

Everyone knows that the theoretical maximum yields of the laboratory are not to be attained in practice; but combining them with knowledge gained by practice on the large scale very truthful figures can be obtained.

The reactions which occur during the electrolysis of an aqueous solution of magnesium chloride may be stated for our purpose here, as:—



It will be seen that this is not a mere splitting up of the chloride into magnesium metal and chlorine. If it were so we should have to overcome affinities represented by 93.5 calories.

The chemical equivalent of chloride of magnesium is made up of:—

Magnesium	12.0
Chlorine	35.5

Magnesium Chloride 47.5

Heat developed in calories.. 93.5

from which we can easily calculate the number of volts required to overcome the chemical affinity. The formula

$$\frac{He}{23} = E = \frac{93.5}{23} = 4.06$$

applies this information, showing that 5 volts would be required in practice, and that 4 volts would not be sufficient.

The gases, however, appear at the electrodes and not the metal, so at we have to overcome the heat of formation of dry magnesium chloride and water, less the heat of formation of magnesium hydrate; it is:—

$$75.5 \times 34.5 - 74.9 = 35.1 \text{ calories.}$$

If we substitute this value for 93.5 calories above mentioned, we have:—

$$\frac{He}{23} = E = \frac{35.1}{23} = 1.53 \text{ volts.}$$

We do not claim rigid mathematical accuracy for this figure, but the practical proof of its being very near the mark lies in the fact that a strong solution of magnesium chloride can be decomposed by the current from a single Bunsen cell.

The next equation shows us that to produce one kilogramme (2.2 lbs. of chlorine per hour, we shall require theoretically 1.54 H.P.:—

$$\frac{35.1 \times 1000 \times 424}{35.5 \times 3600 \times 75} = 1.54 \text{ H.P.,}$$

and a current of 782 amperes is required, as shown by the following:—

$$\frac{1000}{0.000355 \times 3600} = 782.$$

This is all fair sailing, but the foregoing figures refer only to the actual work required for theoretically overcoming the chemical affinity of the chlorine for the magnesium; the actual work in practice can only be known beforehand when the resistances are known. In practice the resistances can be easily measured and kept within reasonable limits.

If we allow 50 square centimetres for each ampere of current, a surface of 4 square metres will be required to yield one kilogramme of chlorine per hour, and knowing the specific resistance of a solution of chloride of magnesium, and allowing the distance of one centimetre between each electrode, we can fairly well ascertain what the resistance of the electrolysing tanks will be, per ampere. The resistance of the conductors can be easily ascertained from their length and section.

Volts

The counter E.M.F. being = ——— is also readily calculated.

Amperes

The internal resistance of the dynamo; resistance due to the polarization of the electrodes and other causes, bring up a total of not less in practice than 0.01 ohm,

$$0.01 \times 782 = 7.82 \text{ volts.}$$

We have already seen that the actual decomposition requires 1.53 volts so that the work there realised is but:—

$$\frac{100 \times 1.53}{7.82} = 20\%$$

of the total, showing clearly that in practice 7.9 brake horse power is required to furnish one kilo. of chlorine per hour, which is equal to 2.8 kilos. per hour of a bleaching powder of 35 per cent. strength.

In order, then, to replace the equivalent of bleaching powder, equal to the employment of 2.8 kilos. (6.2 lbs.) per hour, the installation would have to consist of:—

A steam engine of 8 brake horse power and a dynamo capable of yielding 6,115 watts of effective current.

This can hardly be called a practical installation, let us multiply it by 8 times, it will then be equal to 50 lbs. of bleaching powder per hour, or three tons per working week, and there will have to be installed, one steam engine of 64 brake horse power, and a dynamo or dynamos yielding, say, 50,000 watts.

We have now to determine on the size and style of dynamos. We may have one passing a large current of low intensity, say 10,000 amperes at 5 volts; or eight separate dynamos each giving 1,250 amperes at 5 volts; or we may have one dynamo producing 1,250 amperes at a pressure of 40 volts.

Although but 1.53 volts are required theoretically to decompose the chloride in solution, yet in practice, 5 volts are reached, partly because of the magnesia, which, attaching itself to the cathode, increases the resistance very considerably, and partly on account of the inferior conductivity of dilute solutions, as well as the fact that a considerable current density is necessary, as otherwise the cost of electrodes becomes a most serious question. Five volts may therefore be calculated upon as being absolutely necessary in an ordinary electrolyser.

But though we have any one of the foregoing alternatives before us, it by no means follows that they are equally efficacious in action. The first proposal to send a large current of 5 volt intensity through what is practically a pair of electrodes of immense surface, is so much at variance with modern experience as to be at once discarded, and the second, to send a weak current from eight smaller machines through eight different tanks, is known to result in such a loss of electric efficiency as to be utterly uneconomical. M. Gramme, in his experiments upon the decomposition of water by a current of low intensity, obtained an efficiency of barely 35 per cent., so that in this ratio it is more than probable that in the case of the first problem an engine of 120 brake horse power would be required to drive the machine necessary to produce the equivalent of 3 tons of bleaching powder per week, and there are besides other grave disadvantages into which it is not necessary to enter here. The second installation may also be dismissed from our minds in a similar line of argument, so that we now come to the third proposition of the dynamo yielding 1,250 amperes at 40 volts, and worked in series through eight electrolyses. It is in this connection that our calculations lead us to believe that 64 horse power will be con-

sumed in producing the equivalent of 3 tons of bleaching powder per week of 132 hours, or 50 lbs. per hour, so that without much trouble we can reckon up the cost of the operation. A brake horse power need not cost more than one halfpenny per hour, bleaching powder, say at £5. 10s. per ton at the maker's works, cannot cost the user less than £7. when made into solution in his mill, so that the 50 lbs. per hour produced by power, costing 2s. 8d., is value for 3s. 1d., and in this there is no allowance for maintenance of the dynamo or for the loss of electrolyte wasted in the process.

The foregoing picture does not compare favourably for electrolysis as compared with purely chemical methods, but it is not certain that the disposition of the installation, even in the light we have considered it in our third method, is the most satisfactory one that could be devised.

We are of opinion that a dynamo of 500 amperes and 100 volts intensity, working through 20 tanks in series would prove much more economical. Such a machine will easily yield 90 per cent. of the power applied as available current, in watts, and the cost of 50 lbs. of bleaching powder equivalent might be brought down perhaps to 2s., which allows a fair margin for loss of electrolyte and for wear and tear of the dynamo.

THE DRAWBACK SYSTEM.

A CORRESPONDENT ventilates his views as follows on the system of allowing drawbacks on exports of articles manufactured in this country from imported materials:—

Any law taxing imports, whether for protection or for revenue, necessarily affects the interest of those desiring to export merchandise on which such tax has been paid. The effect is substantially the same in case the merchandise be exported in condition as imported, or in case it be exported in a condition changed by some process of manufacture. Merchandise on which a duty has been paid, cannot, other things being equal, be placed in a foreign market on an equal footing with like merchandise which has not been subject to payment of duty.

The bonded warehouse system, which permits withdrawal of merchandise for export without payment of duty, practically relieves the exporter of foreign goods exported in condition as imported from the disadvantages to which an import duty without such system would subject him. The law allowing drawback of the duties paid on the material used in the manufacture of the articles exported is designed to relieve, and substantially does relieve, the exporter of such domestic manufactures from the disadvantages to which he would otherwise be subjected in foreign markets because of duties paid on material. In most cases articles made from imported material on which duties have been paid cannot be profitably exported without a drawback of the duties paid on such material.

The existing feeling of opposition to all drawbacks can have no good "reason for being," unless it be inability to understand the facts and principles above noted.

The conditions of exportation of merchandise manufactured from imported material are so many and so variable that they cannot be subject to permanent statutes. This fact was recognised by Congress in the law of August 5, 1861, now Section 3,019, Revised Statutes, which provides that drawback shall be allowed, and authorised the Secretary of the Treasury to prescribe the necessary regulations. From the beginning the Treasury Department had administered this law in a liberal spirit. This policy has resulted in a generally fair and successful administration, and has substantially accomplished the purpose of the law. The two exceptional cases in which the law for a time miscarried were clearly faults of administration, and were in no way chargeable to fault in the law. Parties opposed to the law have imagined and charged many miscarriages, which, on investigation, have turned out to be only failures on the part of the fault-finders to understand the purpose of the law.

Unfortunately the law has come to be regarded by some as a piece of class legislation, designed for the especial benefit of American manufacturers, when in fact it was designed only to remove as far as possible a disadvantage to which merchandise manufactured in the United States from imported material was subject in foreign markets by reason of an import tax on such material. Under the existing warehouse system, foreign manufactures may be imported and placed in warehouse, and without payment of any duty may be withdrawn for exportation to foreign markets. To enable a merchant to export an article manufactured in the United States in place of a like imported article, the law undertakes to return to the exporter the duties paid on the imported material used. The interest of the manufacturer of the article exported is only incidental, and is no more direct than that of the labourer employed by the manufacturer, or of the farmer or stock raiser who feeds the labourer. In cases where one party is both manufacturer and exporter, that party is entitled to receive drawback solely because of his being the exporter, as in that capacity he is obliged to meet competition in the foreign market.

In most cases merchandise is exported by some party other than the manufacturer, and in very many cases the exportation of the article on which drawback is allowed, is only incidental to the exportation of some other article, as in the case of bags exported filled with grain, flour, etc., and tin cans exported filled with petroleum, turpentine, fish, fruits, and meats. The application of the drawback law reduces the cost of placing domestic products in foreign markets to what that cost would be in case there was no import duty on the materials used in the manufacture of the packages in which such products are exported.

Certain manufacturing interests have undertaken to persuade the Secretary of the Treasury so to administer existing law that exporters of domestic products might be forced to buy export packages from them, and these manufacturers are now instructing Congress so to revise and amend the drawback law that exporters will be obliged to purchase packages of their make instead of using other packages equally serviceable and costing less. These manufacturers have substantial reasons for trying to make the department and Congress forget that the object of the drawback system is not to give to any manufacturer the right indirectly to tax or throttle the export trade of the country.

Since the right to claim drawback clearly belongs to the party who places the exported article on the foreign market, it is important that the right of that party only should be recognised in the law. The conditions of exportation are such as to make it difficult in many cases to determine who is the exporter of merchandise shipped. Ownership of much of that merchandise changes on the deck of the exporting vessel. Where merchandise is shipped from interior points on "through" bills of lading, ownership often changes while the goods are in transit from point of shipment to port of exportation. These and other conditions make it practically impossible for an executive officer to secure the information which would make him competent to decide how and where to apply the term exporter. The bill of lading, which in all business transactions is recognised as the commercial title to the merchandise covered thereby, always reveals a party who is either the exporter or his agent. These facts clearly indicate the confusion which would result from a legal requirement that the Government should in allowing drawback deal directly with the exporter only, and as clearly indicate that the Government may safely, and should, deal with the exporter, either directly or through his agent.

Some opponents claim that the present drawback system gives an opportunity to use domestic material in the manufacture of an article to be exported, and gives an opportunity to swear that such article was made from imported material, thus laying the foundation for a claim for drawback by means of which the Government would be defrauded. A manufacturer of tin cans might start the manufacture of tin plates in this country, and at a cost considerably above that of imported plates procure plates from which to manufacture cans for export. A manufacturer of bags made from burlaps or bagging, might, by paying a little more than the imported article would cost, procure a like article of domestic manufacture and from that material make bags to be exported, using a like quantity and kind of imported material to make bags for domestic use. What has been said of the manufacturers named may be said of all manufacturers excepting such as are made from material the like of which is not produced in this country. The opportunity for perjury and fraud on the part of the manufacturer and exporter is, in all the cases noted, clearly manifest. To get the measure of the danger to which the revenue is exposed because of these opportunities, it is only necessary to ascertain the strength of the motive or impulse to which manufacturers and exporters are subject. Thorough search discovers no reason why a refiner of sugar should set apart for export the product of raw sugars grown in the United States or the Sandwich Islands, and put on the home market the product of raw sugars on which import duty has been paid. Absolutely nothing could be gained by perjury and fraud in the case considered. In case of tin cans, considerably less than nothing could be gained by the use of like means. Perjury and fraud on the part of manufacturers of bags would, in the present condition of the market, result in a gain for the criminals of a trifle less than nothing. In no case could the use for export of domestic material in place of like imported material benefit either manufacturer or exporter, because the present system would necessitate the setting apart for domestic consumption of a like quantity of imported material, so, unless it be assumed that manufacturers and exporters will commit perjury just for the fun of the thing, and defraud the Government at considerable expense to themselves, the fears expressed relative to danger of the revenue from frauds of the kind considered are groundless, and it seems worse than absurd to propose to cripple the export trade by laws to prevent motiveless crime and profitless fraud.

Free traders claim that duties on raw material prevent the exportation of articles made from such material. The drawback system gives all the advantages which free trade can offer to manufacturers and exporters by practically making material for exports free.—*Oil, Paint, and Drug Reporter.*

Legal.

SIR WILLIAM THOMSON'S COMPASS.

IN the Chancery Division of the High Court of Justice, the case of Thomson v. Hughes and Son has been heard. Lord Justice North was moved by the plaintiff to grant an injunction that the defendants, their servants, agents, and workmen might be restrained until the trial, or further order, from making or selling any compass cards similar to the card now being manufactured and sold by them as the "Paget" card, and from making and selling any other cards similar to the cards described in the plaintiff's specification, except only cards the same as the compass cards sent by the defendants' solicitor to the plaintiff's solicitor on the 1st January, 1889, and referred to in the order of the Court of Appeal made in this action on the 6th March, 1889, and that the defendants be ordered to pay the cost of this motion. The Attorney-General (Sir Richard Webster, Q.C., M.P.), Mr. Aston, Q.C., and Mr. Bousfield were retained to argue the case for the plaintiff, while the defendants were represented by Mr. Fletcher Moulton, Q.C., and Mr. Chadwyck Healey. The Attorney-General, in opening the case for the plaintiff, said the action was brought on Thomson's patent of 1876. The defendants were making something which was in no way a "Paget" card, but which was in all essential particulars the same as the "Moore," in respect of which the defendants had submitted to an injunction. This the plaintiff had discovered in November, 1889, whereupon he at once wrote to the solicitors of the defendants, requiring an undertaking that they would not sell any more "Paget" cards. The defendants wrote back that they had kept an account of the cards made under the "Paget" specification, and would continue to do so. The "Paget" patent, however, had expired, and if the defendants were really making a "Paget's" card there was not the slightest reason to keep an account. If his the Attorney-General's affidavits were correct, there was no doubt that the defendants were not making a card according to Paget's specification, but making a card taking all the merit of Sir Wm. Thomson's invention, and selling it as a "Paget" card. Prior to Sir Wm. Thomson's card, the best compass known was the Admiralty Compass. Compasses were affected by a number of errors, the chief being the permanent magnetism of the ship, the magnetism induced by the earth in the soft iron of the ship, and what was known as the "heeling" error. Sir William Thomson for the first time practically showed people how to use short magnets, which corrected these errors. He, for the first time, combined a light card with short needles so placed that the result was the obtaining of a very slow period of oscillation, while at the same time a steady compass, and one to which these corrections could be very readily applied was secured. Sir William Thomson was led to the line of thought which resulted in his invention by having to write the biographical notice of Mr. Archibald Smith, a member of the Bar. He found such difficulty in pressing the matter that he had to take up the manufacture of his discovery, and had to demonstrate the efficiency of his compass cards on his own yacht, and in vessels on which he fixed them gratuitously, with the result that there had been a number of attempts to infringe his patent. The validity of the patent was fought before Mr. Justice Kekewich, and judgment was given in his favour. The same thing happened in Ireland and, practically, in Scotland. Mr. Moulton, Q.C., on behalf of the defendants, submitted that the matter should stand over in order to give the defendants an opportunity of cross-examining the plaintiff's witnesses. He further contended that what his clients were manufacturing was substantially the "Paget" compass card, with regard to which no undertaking was given in the Court of Appeal. Mr. Justice North said that it seemed to him that the defendants had made a card which, for all practical purposes, was the same as that which he had undertaken not to make. Looking to the balance of convenience and inconvenience, he was not, however, in favour of granting an injunction. It seemed to him that the plaintiff could lose little, if anything, if he did not grant an injunction, and the plaintiff was successful at the trial, while the defendants might lose a great deal if he granted an injunction, and the defendant turned out successful. Under these circumstances, on the authority of a case in the Irish Court of Appeal, he must refuse to grant an injunction, asking the defendants to give an undertaking, by counsel, that they will keep an account of all the cards they make during the continuance of the patent. Mr. Chadwyck Healey signified that he would give the undertaking asked for. The question of the costs of this motion was reserved.

BEEF EXTRACT.—As a source of "beef extract" the horse has found formidable rival. The chemist at the Russian whaling station of Port Wladimir, on the Murman coast, announces his ability to produce the article from whale flesh. The new product is said to be equal to genuine beef-extract in appearance and taste.

THE ESTIMATION OF THE RELATIVE AMOUNTS OF CHROMATE AND BICHROMATE IN A MIXTURE.

By J. ARTHUR WILSON.

THERE are a few operations in which, not only is it requisite to determine the actual percentage of chromic acid, but also to know the state in which it exists, and the amount, for instance, in mordanting with bichromate and sulphuric acid, in woollen dyeing, and in the manufacture of bichromates themselves.

The new indicator of Traube and Hock, viz., lacmoid, reacts neutral to bichromate, and alkaline to chromate, so that it may be used. The method is very simple; the solution is titrated with N/2 sulphuric acid, till paper painted over with neutral lacmoid solution shows a faint red. The following shows the results obtained from my notebook, in some test experiments:—

Substance taken.	c.c. Standard Acid.	Found.
1. 1grm. pure K ₂ CrO ₄	5.15 c.c. of Normal H ₂ SO ₄	1.0012
2. " " " "	" " "	"
3. 1grm. pure K ₂ CrO ₄	5.15 " N H ₂ SO ₄	1.0012
0.5 " " K ₂ Cr ₂ O ₇		

There is another method which does not seem to be sufficiently well known, and I was somewhat surprised to find no mention of it in looking over the latest edition of Sutton's Volumetric Analysis. It depends on the fact that the blue colour of chromium heptoxide, imparted to ether, is not produced till slight excess of sulphuric acid is present. The moment this excess is produced, the blue colour is imparted to ether. The method applied to mixtures of chromic and bichromic acids is as follows: 5 grammes of the substance (say a mixture of K₂Cr₂O₇ and K₂CrO₄) is dissolved in about 50 c.c. of water, and 3 c.c. of hydrogen peroxide added (the acidity of the hydric peroxide must be slight, or if more than usual it must be estimated and allowed for), and the liquid covered with a layer of ether, a few centimetres deep. The spit of the burette should be long, and pass through an indiarubber stopper which fits loosely into the test tube or small flask holding the mixture. Normal sulphuric acid is then added, with agitation, till the well-known blue colour is produced in the ethereal layer; Results are a little too high, but good enough for all practical purposes. Test trials from my laboratory notebook:—

Weight of Substance, taken in grammes.	c.c. of Normal Sulphuric Acid.	Amount, from the Acid consumed.
1. 2.5017	12.9	2.507
2. 2.5012	12.9	2.517
3. 2.508 K ₂ CrO ₄		
1.034 K ₂ Cr ₂ O ₇	13.0	2.527

THE FREIGHT MARKET.

MESSRS. Angier Bros., in their last circular, say freights during the past fortnight have been dull, not much doing, and rates weaker generally. In China waters a few coasting orders were filled at 14 to 16 cents. per picul, Saigon to Hong Kong, but homewards employment is difficult to find. From Burmah and India the late improvements in rates was barely maintained, and orders are scarce since the last few fixtures. Black Sea business has been very dull for both prompt and spring loading at lower prices. Mediterranean employment is poor, with less demand for tonnage at a decline in rates. American business keeps fair, and the fixtures show little falling off, except that the demand is more limited. Nearly all the steamers bound out have experienced unusually severe weather and long passages, materially interfering with shipment and contract dates. The River Plate offers fair rates for March to May loading. Very little business offers for outside boats from the Brazils. In time charters orders are scarce, rates 9s. to 10s. Outward coal rates keep very low all round, with considerable delay in loading. Iron and berth cargoes follow the coal rate. Bunker coals are slightly cheaper and easier to get; wages are maintained at the late advance. Under present circumstances old boats are making little or no real profit, and the cheaply bought new boats are giving seriously diminished returns.

BARBADOES.—Messrs. Laurie and Co. in their circular say:—During the past month we have been amply supplied with seeking tonnage suitable for all inquiries, and quite a number of vessels have

been taken up. The sugar season is near at hand, and we have already made some engagements from Martinique and Guadeloupe to French ports. We anticipate a large demand for tonnage during the reaping season, as the crops all through the West Indies are reported as being very large.

CARDIFF.—Messrs. Henderson Brothers advise us of the following fixtures yesterday:—Gibraltar, 7s., Ulleswater; Smyrna, 10s. 6d., Acheen; 19s., Badsworth; Tarragona, 9s. Dunkirk; 9s., clean copper, Blackwater.

DEMERARA.—Messrs. Sandbach, Parker, & Co. advise us of the following charters and freights:—Charters—A. C. Wade, sugar, U.S.A., 15c direct port, 16c Delaware Breakwater; Acadia, sugar, 14c New York, 16c Philadelphia; Arecuna, sugar, 15c Philadelphia; Greve Frijs, molasses, Copenhagen, 30s. Freights—Steam to London, sugar, 1s. 6d per cwt.; rum, 2¼d. per gallon. Steam to Liverpool, sugar, 1s. 6d per cwt.; rum, 2¼d. per gallon. Sail to London, sugar, 1s. per cwt.; rum, 1½d. per gallon. Sail to Liverpool, sugar, 1s. 3d. per cwt.; rum, 2d. per gallon.

DUNDEE.—Our correspondent writes that for the Baltic trade (wood) vessels are being fixed to load timber, at Baltic ports, at 30s. for Dundee. Last year the season opened with rates at 35s.

GLASGOW, Monday.—Our correspondent telegraphs that there was a quiet feeling in the Glasgow Freight Market to-day, and little business was completed. Ships reported fixed:—San Francisco, to United Kingdom, Havre, or Antwerp, 36s. 3d.; West Coast of South America to United Kingdom, 31s. 3d.; Newcastle, New South Wales, to San Francisco, 21s. In steam tonnage a vessel is fixed—Leith to Genoa, 9s. 6d. Bombay open charters:—25s. is quoted Feb. loading.

MAURITIUS.—Messrs. Chadwick and Co. have received the following telegram from Messrs. Scott and Co., dated January 23:—Freights steady—to United Kingdom or Colonies, 25s. and 5 per cent. per ton; to Bombay, six to eight annas per bag.

NEWCASTLE, N.S.W.—Mr. Wallace's circular contains the following fixtures:—For San Francisco—The export is 12,901 tons coal; the Glencairn, Crown of Italy, Harvester, and Celtic Chief are here to load about 9,000 tons, under home charter. For San Diego—Five vessels have gone forward, taking 7,359 tons; there is nothing here to follow. For Hong Kong—The Altcar chartered 16s., Ringleader at 15. 6d., and the steamer Tannadice, on ship's account, have sailed with 4,403; 15s. 6d. is offering. Freights—Hong Kong, 15s. 6d.; Manila, 15s.; Ilo Ilo, 15s. 6d.; Java, 17s.; Singapore, 16s.; Saigon, 18s.; Cheefoo, 18s.; Amoy, 18s.; Padang, 21s. (nominal); Madras, 18s.; Bombay, 18s.; Colombo, 18s.; San Francisco, 17s.; San Diego, 18s.; Wilmington, 17s. 6d.; Mauritius, 16s.; Honolulu, 14s. (nominal); Valparaiso for orders, 22s. to 25s.

ODESSA.—Mr. Marshall Little has received the following telegram from Messrs. M'Nabb, Rougier and Co., of Odessa, dated February 2:—Market quiet. Berth—Odessa or Sebastopol—January-February loading, London or Hull, 17s.; Antwerp or Rotterdam, 17s.; March-April loading, London or Hull, 18s. 9d.; Antwerp or Rotterdam, 18s. 9d.; Nicolaieff, 1s. 3d. extra; Mediterranean, fcs., 1-55. Charters—Rates for opening navigation unchanged. Require two 9,000 qrs., to load at Odessa 23s. late March, early April, less 1s. 3d. reduction direct port U.K. or Continent; Nicolaieff 1s. 3d. extra, option of a safe port between Bergen, Copenhagen 3s. over direct rates.

VALPARAISO.—Messrs. Cockbain, Allardice and Co. have received the following telegram from their Valparaiso house:—Nitrate and wheat, for orders, 35s. U.K. or Continent, less 1s. 3d. direct port, for ready vessels; guano, for orders, 31s. 3d. U.K. and 36s. 3d. Continent, less 1s. 3d. direct port, for ready vessels; copper or manganese ores, 31s. 3d. U.K. and 36s. 3d. Continent, less 1s. 3d. direct port, for ready vessels.

THE USE OF PLUMBAGO IN COTTON GINS.—The following circular, signed by a large number of New England cotton manufacturers, has been sent to the New Orleans Cotton Exchange:—"Graphite, or plumbago, appears to be coming into common use in the South as a lubricant for the bearings of cotton gins. Numerous pieces of black, greasy cotton have been found in bales when opened at the mills. In one factory alone some sixty bales have been found to contain small pieces of this very dirty substance. We suppose that in cleaning off the journals of the gins a piece of cotton is used, and the dirty cotton, covered with the greasy plumbago, carelessly thrown into the lint pile, gets packed in the bales of cotton, or that the shaft which carries the belt drips the grease into the lint. The loss, if the plumbago is found, is trifling, but if a small piece is carried into the machinery, a mass of cotton is blackened and ruined by it. There is no known solvent for plumbago, and it smuts everything it touches. We beg you to draw the attention of all cotton receivers to this matter, and to ask them to notify the planters of the trouble, and get them to put a stop to it as soon as possible."

LINSEED OIL IN THE ENGL

IN their annual market report just to hand, the Rose of London, have the following to say of the product:—

Linseed.—A very appreciable improvement in the value of most articles in which we were marked features of the year just closed, product under review, sales were more readily made than in time past, and the demand being fully equal to the supply, prices with few exceptions, gradually improved, though checked in some degree by the serious business and consequent loss of trade resulting during August and September. The total imports of the United Kingdom was 2,270,000 qrs., against 1888, 2,341,175 in 1887, 2,081,283 qrs. in 1886, and 1885. The Indian crop was reported to be a failure up to the present, probably on account of the ruling there lately bringing out all available stock of previous years, a largely increased quantity having been brought to this country has received rather less than in the year of a disastrous failure of the crops, and is to be totally unfounded, as the supply is unusually large; values, however, did not give the impression of becoming apparent. The crop from the River was poor one and the quality inferior, owing to a late time of harvesting. Many cargoes were shipped and arrived heated and damaged to such an extent as to be unsuitable for manufacturing purposes, and giving great dissatisfaction. America helped to supply her increased demand largely of Indian seeds in our markets, over 100,000 qrs. transhipped from London, about 21,000 qrs. from Liverpool, and 11,000 qrs. from Liverpool.

We start the year with fair supplies on hand, but on passage, and shipments from India for the year are likely to be exceptionally small. Some parcels of lately unsold on importer's account have been sold at a marked improvement in rates before the arrival of satisfactory rains having fallen in India, prospects (sales of which up to the present have been very far from satisfactory) are now, considered favourable. Plate come good reports of the crop, both as to quantity and quality. The market opens steady with prices: Spot Calcutta 41s. 6d. ex ship; December-January 42s. 3d. @ 42s. 6d.; March, 43s. 6d. @ 44s. 6d.; April-June, 44s. 6d. @ 45s. 6d. Bombay, 43s. 6d. @ 44s. 6d.; April-June, 44s. 6d. @ 45s. 6d. Azov, spot 41s. Reval, 95 per cent., 37s. Riga, 7½ measure, 37s. La Plata, sailer January 39s. Bombay, January-February Dunkirk, 44s.; February-April-June, Amsterdam, 42s.

The import into London was from the following

East Indies.....	1889.	1888.	18
Black Sea	qrs.	qrs.	q
Baltic and White Sea			
Other ports.....			
Total imports into U.K. ...	2,270,000	2,542,027	

Afloat by last mail advices:—

	1890.	1889.	18
	qrs.	qrs.	q
From E. Indies to U.K.	134,880	177,23	

The stocks in warehouse and vessels discharged are:—

	1890.	1889.	1
	qrs.	qrs.	c
London	45,000	25,000	3
Hull	140,000	164,000	12
Liverpool	35,000	10,500	1

Linseed Oil.—The total production in the United Kingdom was a large falling off compared with the previous two years, and can be estimated, was as much as some 23,000 tons less than in 1888. It commenced the year with a stock of about 7,000 tons in Hull and most of the principal markets on the coast, and these rather increased till the early months, but by the autumn they were again falling. The article met with considerable activity at time of the whole showed a market improvement upon 1888 prices, the low prices, both on the spot and for

richness of the Indian seed crop, created a good speculative business, which, with the decided improvement in trade generally, continued to the end of the year. Hull oil in this market is not dealt in to any great extent; the exports show an increase of 1,500 tons upon that of 1888.

	1889.	1888.	1887.	1886.
Tons.	Tons.	Tons.	Tons.	
Export from Hull for the year	6,770	5,200	8,060	10,244
Reduction in the U.K., we estimate	105,000	128,000	116,000	98,000

Oil Cakes.—Values of London-made Linseed ruled higher than in 1888, and, except at the close of the year, generally met with a fair sale at current rates. January saw the highest figure of the year, up to 19s. being paid for best qualities. In June 17s. 5s. and 17s. 10s. was accepted, the market improving later to 18s. and 18s. 5s. present value.

As a comparison to the foregoing report, we present the following remarks from the annual circular of Game, Bowers, and Co., of London.

Linseed.—The imports from India have again been very considerable, and a large quantity of North Russian seed was imported into Hull during the summer and autumn. Prices of India seed have ruled at the most part in sellers' favour, regular supplies having been taken from this market to supply the American demand. Although in the early spring large sales of forward shipment Calcutta were made as low as 38s., the value steadily advanced until in the autumn 44s. @ 44s. 6d. was reached for seed in all positions. Owing to heavy arrivals at the end of the year, and small demand, the price of spot seed has fallen to 18s. 6d. at which several parcels have changed hands. To-day the market closes firmer, with buyers at 42s. January-February shipment quoted 42s. 6d., and spring shipments 41s. @ 39s. 6d. according to position. The business in Bombay to the United Kingdom has been smaller than usual, this class of seed having been mostly sold to the Continent direct. We quote December-January shipment 44s. Black Sea is 41s. for parcels afloat to Hull. Petersburg 95 per cent. is 40s. or shipment, 39s. is asked for La Plata cargoes.

The export from Calcutta to the United Kingdom for the second half of December is telegraphed as 2,400 tons against 7,100 tons in 1888. The total import into London during 1889 has been 871,788 qrs. against 954,093 qrs. corresponding period last year. The quantity afloat from the East Indies, per last advices is:—

	Calcutta		Bombay	
	1890	1889	1890	1889
	Qrs.	Qrs.	Qrs.	Qrs.
To London	114,853	92,296	....	4,269
Liverpool	33,183	28,855	5,844	5,462
Hull	....	64,931	....	....
Other ports	....	1,369	....	....
Coast for orders	....	....	....	....
Continent	....	....	18,098	7,928

Total..... 148,036 187,451 23,942 17,751

Linseed oil.—The make has been smaller than the two previous years, and the large stock held in warehouse having been consumed, there has been an upward tendency in this article during the past twelve months. The market closes steady.

A STORY OF EARLY PETROLEUM DAYS.

QUINCY Robinson related an incident of the early history of the oil regions recently, which may give the children of the present generation a vague idea of the magnitude of the transactions which took place when oil was \$8 and \$9 a barrel, and poor people gained a competency by scooping it off the surface of creeks, or gathered it from pools around the tanks which had overflowed. The story as told by Mr. Robinson was as follows:—"Within a month after Colonel Drake had struck the first petroleum ever brought to the surface in America by means of drilling, my father and the father of my relatives here brought a tract of land comprising 1,280 acres adjoining the farm on which the Drake well was located, for \$350,000. Not long afterwards I was sitting in their office one day—I remember it as distinctly as though it happened only yesterday—when an agent for an eastern syndicate walked in and offered \$500,000 for the 1,280 acres. The owners looked at him rather incredulously for a moment, but before they could speak he had counted out on the table \$500,000 in cash and drafts which he offered for a deed of the tract. I was appalled by the site of the pile, but my father and the father of these gentlemen retired for consultation, and decided that if the property was worth \$500,000 it was worth \$1,000,000, and the offer was refused. Their heirs still own the land, and now it is valued at \$20,000. Where they could have got dollars we could scarcely get nickels. Thus you can see what seemingly fairy stories could be told of those days. They are almost incomprehensible to the present generation, but they were red-hot facts," and a sigh of regret that the offer had not been accepted went round the circle.—*Pittsburg Dispatch.*

A NEW INDIGO VAT.

WE are pleased to notice the introduction of a Patent Indigo Powder by Mr. J. Cowan of Glasgow, which promises to create a revolution in this branch of dyeing.

In five minutes anyone may now have a genuine Indigo vat, by simply adding to hot water in an iron or zinc vessel heated by fire, "dumb" or unperforated steam pipes, or a steam jacket or casing, equal quantities—by weight—of Patent Indigo in the form of prepared powder, and liquid bi-sulphite of soda. After boiling for a minute or two, put off boil, and let dye-liquor settle for several minutes. It will then have a pure yellowish green appearance, with a coppery film on surface, and dyeing is conducted in the clear liquor, procedure as regards handling, squeezing, and airing, being practically same as by old processes.

A dye-liquor, prepared as above directed, but subject to modifications of temperature as detailed in the next paragraph, will dye wool, silk, cotton, and linen, to any desired shade, and in one or more operations, according to concentration. In place of about 120° Fahr. as hitherto for woollen work, and cold for cotton and linen, the following heat may be employed in dyeing with this new vat:—For unspun wool, 180° to 200° Fahr.; for woollen piece goods and light serges, 150° to 180° Fahr.; for woollen yarns, 130° to 160° Fahr.; for silk, 120° to 160° Fahr.; and for cotton and linen, 120° to 150° Fahr.

As there is no lime in this Patent Indigo Powder, no necessity arises for those vexatious delays between dyeings, at present required when fresh stuffs are added, five minutes sufficing with this new vat for dye-liquor to clear, after fresh indigo and bi-sulphite have been stirred in. In large dyeworks such stuff may be conveniently added to vat as required, from a stock kept ready boiled up in separate boiler, and prepared as instructed in paragraph 1, but in a concentrated form. This arrangement allows vat liquor to be kept at the heat suited to the class of work in hand. It follows, therefore, that the total absence of lime from this new vat, permits of continuous dyeing in it, the importance of which fact will be at once apparent.

In dyeworks where a large daily output is imperative, great economy in plant—and consequently in space—is effected by the use of this patent indigo, as its power of continuous dyeing enables one vat to equal, or even exceed the production of several, under old methods. In the case of cold dyed cotton and linen yarns, a series of vats is at present indispensable, but by this new process one vat gives any shade of blue wished, and in one or more "runs" or "dips" in dyer's option. Unspun wool dyed in this vat is beautifully soft, elastic, and uniform in shade, while piece goods and yarns are better penetrated by the colour, owing to the higher dyeing heat available. For the same reason they are much more easily and cheaply cleaned.

It may be stated here with regard to scouring and sulphuring, that such blues are in these respects entirely satisfactory, and, also, that under prolonged exposure to light, and the severest weather conditions, they remain absolutely unchanged. Cotton cloth, yarn, and thread treated in this vat—as also all linen products—are unusually level in shade, and well dyed through. Such blues are very fast to soaping, and far excel cold-dyed blues in resistance to bleaching. Warps or "chains" are dyed to shade in one vat, and in one continuous operation, thus saving time and labour, and keeping the fibre agreeably soft. Being extremely clean, these blues, when woven into white goods, can be calendered direct from loom without staining the fabric, unlike cold-dyed blues, which are so imperfectly fixed on the fibre as to necessitate elaborate precautions being taken ere calendering can proceed, to protect goods into which they are woven from being soiled during the process. Fast greens of all shades for shipment are also readily obtained in this vat.

When prepared as a paste, it will be found that the patent indigo powder may be used for printing calico, or other tissues and fibres, either by block or cylinder, and in conjunction with colours for "steaming styles." These indigo prints stand the strongest steaming and soaping, without blurring or "running" in the slightest degree on the fabric, which requires no preparation beyond that given for steaming colours. Pure indigo blues, dyed in this new vat, give the genuine indigo re-action with nitric acid, and stand all "government" or other usual tests, whether acid or alkaline. The customary "bottomings" and "toppings" used for indigo work on wool, woollen goods, cotton, and linen, may all be employed with this patent indigo.

NORTH-EASTERN RAILWAY.—The return of the North-Eastern Railway Company's receipts for the past week is the best this year, though the gross total of the earnings is far below the summer average. Compared, however, with a year ago, passengers yield an increase of £2,064; merchandise and cattle give £5,109 more; minerals have increased by £4,454; and dock dues, &c., by £97. There is thus, for the week, the increase of £11,814; and for the half year, so far, the increase is £31,208. It seems as if the current half-year would be a better one than has been the past.

SOCIETY OF CHEMICAL INDUSTRY.

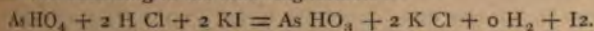
MANCHESTER SECTION.

ON Tuesday evening was held the ordinary monthly meeting of the Manchester section of the Society of Chemical Industry, Mr. Ivan Levinstein occupying the chair. Two short papers or communications were read by Mr. W. Younger, the first being a description of the method of analysis employed by the reader to analyse the mixture of Deacon gases at the Radcliffe works. In the process employed, the chlorine, hydrochloric acid, moisture and air, are obtained from one aspiration. The gases are first drawn through three bottles containing oil of vitriol, in which the water is absorbed, and then through a tube containing arsenious acid, from which the chlorine and hydrochloric acid is obtained, while by means of an analysis of the gases remaining in the aspirator the excess of air and nitrogen is obtained. After the aspiration is over a chloride of calcium tube is attached to the oil of vitriol bottles, and air drawn through them so as to displace the chlorine from the atmosphere above the oil of vitriol. The increase of weight of the oil of vitriol bottles gives, of course, the moisture. Mr. Younger stated that the method for obtaining the quantity of moisture present is accurate, as sulphuric acid naturally absorbs minute traces of chlorine and hydrochloric acid, and in order to prove this he had analysed the contents of the three bottles, and had only found them to contain 0.03 of a grain of chlorine. Analysis of the Deacon gases were then given, from which the members learnt that they possessed the following composition:—

Air	80.50
Chlorine	4.41
Hydrochloric Acid	0.06
Moisture	2.46
Nitrogen	12.57

100.00

Mr. Younger also read a second paper, on the reduction of arsenic acid by hydrochloric acid. He pointed out that when hydrochloric acid and potassium iodide are added to a solution of arsenic acid, iodine is liberated. The reaction takes place more readily on boiling, and the reader described experiments to show that the iodine liberated exactly corresponded with the reduction of the arsenic acid to arsenious acid, and acted according to the following formula:—



The author stated that he has employed this process for estimating the arsenic acid in various substances. As an excess of iodide of potassium is also employed, it is found that on cooling, a further slight liberation of iodine takes place, but this is prevented by the addition of a few c.c. of glycerine, which in no way interferes with the reaction.

At the close of the meeting Dr. Bailey opened a discussion respecting the Technical Instruction Act, and the probable effects of its adoption on the locality. He said that he was perfectly well aware that the Science and Art Department intended to have something to say on the question, but he was not aware until that morning that if Manchester adopted the Act, according to the version given by Colonel Donnelley, the people here would be asked to provide the money; and the Department at South Kensington would provide inspectors and practically regulate and rule the teaching, and leave the local authorities no say in the matter whatever. He said that primarily he had an impression that if the City Council chose to put the Act into operation it would be free to do as it thought fit. He was not aware, as he had said, that the Council would practically have no power to decide the course of action. The Chairman, in making a few remarks upon the views expressed by Dr. Bailey, said he would like to hear the opinion of the members as to the desirability of discussing the question after due notice at a subsequent meeting. There was, he said, a good deal of dogmatizing and theorising on the subject, and he felt sure a great many people were talking about it who had not the slightest idea of what was wanted by those who were engaged in manufacturing and chemical industries. Mr. H. Grimshaw remarked that one of the things they desired to be free from was the domination and red-tape of South Kensington. It was due to the iron system of South Kensington that chemical classes all over the country were of such little use to persons who were intending to apply themselves to chemical industry, or even when they were about to enter the professional branch. Dr. Bailey then gave notice that at the next meeting the application of the Technical Instruction Act of 1889 be brought before the society for discussion.

SCOTTISH SECTION.

The third meeting of the session took place in Edinburgh, on the evening of Tuesday, 4th inst., Mr. R. R. Tatlock presiding. Mr. B. Readman, D.Sc., F.R.S.E., read Part I of an exhaustive paper by him on the "Manufacture of Phosphorus." It was nearly certain, the paper begun by pointing out, that phosphorus was first dis-

covered fully two centuries ago, by Brand, an alchemist, of Hamburg, who prepared it by distilling evaporated urine and sand along with carbon, and condensed the distillate. About a century later the existence of phosphate of lime in bones was discovered, and a few years subsequently the Swedish chemist, Scheele, announced a process by which phosphorus could be obtained from bone ash. From the days of Scheele till quite recently the latter was used for the preparation of phosphorus (held as a compound body until Lavoisier proved it to be an element), but now, however, native mineral phosphate of lime has taken the place of the other. In selecting a mineral phosphate for purposes of this manufacture, it is of importance to obtain one with a high percentage of phosphorus and a minimum of iron and alumina. As a typical example of suitable phosphates met with in the market may be taken the Canadian, which frequently contains as high as 17 per cent. of phosphorus. The phosphate is first ground to a very fine powder, and then decomposed with sufficient sulphuric acid to convert all the lime there present into sulphate of lime, this operation being performed in large wooden tuns, with agitators, and heated by steam. After decomposition the contents of the tun are run out into filters to separate the sparingly soluble sulphate of lime from the phosphoric acid liquor. This effluent is then evaporated down to a syrupy consistence in lead-lined evaporators, and is afterwards mixed with carbonaceous matter, such as wood, charcoal, or coke, and carefully desiccated either in iron pots or other suitable furnaces. So prepared, the mixture is distilled in short retorts of best Stourbridge clay placed in a furnace similar to the Belgian furnaces used in the distillation of zinc, with a capacity of about 30 retorts each. This distillation occupies about 16 hours, crude phosphorus of a dull mahogany-brown colour being obtained. Refining is effected by fusing under water and agitating along with bichromate of potash and sulphuric acid, the result being the pale yellow phosphorus of commerce. Dr. Readman concluded this instalment of his paper by showing how small, really, was the quantity of phosphorus used in the production of matches, ordinary boxes of these containing each only from half a grain to two-and-a-half grains, according to make and brand. Highly appreciative remarks were made by several members, and attention called to the errors found in the text-books as touching the manufacture of phosphorus and other chemicals. Mr. G. H. Gemmell read a short paper on "Moisture in Pulp," referring to the variations in straw and wood paper pulp. For his own part he thought 10 per cent. was a fair average of moisture in air-dried pulp, although paper makers themselves average at 8 or 9, and others contend for as high a figure as 12.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- STILL TAX.**—We shall be pleased to open our columns to a discussion of the question, but please stick to facts.
- COMPETITOR.**—We do not wish to receive any of the prize competitions before the time specified.
- JULIUS.**—We cannot vouch for the correctness of your views when you cynically state that all the talent of the chemical trade is centered at 32, Blackfriars-street, but we can tell you that the bulk of the information is centered there.
- J. B.**—Purely an agricultural question.
- JOHN.**—We fear you have not read the article too carefully. The process you mention has been tried in several different ways, and all have failed.
- R. C. S.**—We will see; but Bristol is not a port of any great importance.
- OILMAN.**—It is our intention—as we have been requested by so many—to pay more attention to the oil, paint, and colour trades.
- CHLORINE.**—Bleaching liquor is a lime salt, and not a soda salt, as you infer. It is made (1) by passing chlorine into milk of lime, or (2) by dissolving bleaching powder in water.
- T. R.**—We are not aware of any such process.
- BETA.**—A sulphuret of antimony produced in the wet way. 2. ree sulphur.
- EX-OFFICIO.**—We are not aware of the exact conditions. Apply to the Secretary, who will doubtless supply the information.
- ANALYST.**—We are biased in favour of litmus, it is a well tried, true, and trusty friend; but some of the newer indicators have their special uses.
- C. C. C.**—Yes. Many years ago.
- A RIVER POLLUTOR.**—We would rather not offer any opinion.
- B.**—A correspondent wishes to know whether a still holding a gallon, and used for producing distilled water, is liable to the still tax. We do not know. If it is so, a great many photographers are liable.
- B. J. R.**—We should regard it as an adulteration, and we think a court of law would come to the same conclusion.
- P. J. A.**—See an article on the subject in this week's number.
- AMMONIA.**—No doubt you are in some respects correct. We have come to the same conclusion. It is a pity some men should travel about the country endeavouring to corrupt the business morals of all they come in contact with.
- T. P.**—The substance you mention is sold in this country as hot neck grease, sometimes alone, and sometimes melted with a portion of tallow, for use in lubricating the rolls in iron works.
- H. CL.**—(1) It matters not whether the methods sent are old or new. (2) We shall judge them by their intrinsic merit only. (3) Yes; we should prefer drawings, either coloured or shaded.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE TAX ON STILLS.

To the Editor of the Chemical Trade Journal.

SIR,—You will have done good service to the chemical trade by calling public attention to those absurd visits of excisemen so well known to all entrusted with the management of chemical works.

When we first started to make sulphate of ammonia, it was a new thing in this district, and our stills were old boilers placed horizontally and worked into closed saturators. We had only been going a few weeks when in walks Mr. Exciseman. Oh! says he, you are working a still here without a licence. That's where you make a mistake says I, we've no stills here. To be sure, I must see says he; so you can says I, and he went wandering all about the yard and nearly burned his nose at the ammonia boiler without ever being able to catch a glimpse of even a ghost of a still. We never worked *stills*, they are too dangerous to be trusted, so we always bought old boilers, which the exciseman thought were steam boilers, and so let us alone.—I am, &c.,

WILL O' TH' WISP.

EXPERT EVIDENCE.

To the Editor of the Chemical Trade Journal.

SIR,—It is morally certain that no sensible man can take up your journal of the last few weeks and read the Legal intelligence therein recorded without coming to the opinion that some radical change is needed in the method of receiving and giving scientific evidence in our courts of law.

In the Massey-Brook bone works nuisance, two experts gave evidence that they had examined the works, and although it is presumed they carried their noses with them, they could not discover any nuisance, plainly smellable by anyone residing in the neighbourhood. Of what value is such evidence as this?

The next case is the action against a Styal farmer, and with all due deference to the comparative ability of the experts engaged in the case, it does not argue very well for the reputation of chemistry as an exact science. One chemist says the manure is "worthless to throw on the land," another says "it was of reasonable merchantable value." Pray who is to be believed?—I am, &c.,

A CHESHIRE FARMER.

THE STILL TAX.

To the Editor of the Chemical Trade Journal.

SIR,—Your leader in last week's issue as to the manner in which the officials of the Board of Inland Revenue do their work, and the petty annoyances they heap on the small trader, is very much to the point, and, it is to be hoped, will serve a useful purpose, even if only to awaken the trade to a sense of the injustice shown to many chemists by the subordinate officials of the Board of Inland Revenue. It is not many years ago that I was manager and part owner of a small vitriol works, where vitriol was rectified and sold, and, to the best of my belief, we paid a tax of five shillings a year for the privilege of using a still, though I could never see why we should have paid it. I am very strong in the belief that the interested branches of the trade should form a committee to sift the question, and take a test case to the law courts if found necessary. I feel sure there would be no difficulty in raising the wind for so laudable and necessary an object, and it might result in the Inland Revenue department being obliged to refund the monies it has wrongfully taken from the chemical trade for so many years.—I am, &c.,

EX-MANUFACTURER.

IMPURITIES IN GLYCERINE.

UNDER the title of "Adulteration of Glycerine," F. Jean contributes an article to the *Journal de Pharmacie d'Alsace Lorraine*, in which he considers not merely adulterations intentionally added, but impurities due to carelessness in its manufacture or purification. Among them are oxide of lead, lime, and butyric acid. French perfumers and manufacturers of cosmetics test their glycerine with nitrate of silver. If no turbidity or change of colour takes place in 24 hours, it is considered good.

The chloroform test for glycerine consists in mixing equal volumes of chloroform and glycerine, shaking thoroughly, and then letting them stand. The upper strata is pure glycerine, while the lower one is chloroform containing all the impurities. If there are no impurities in the glycerine the chloroform remains unchanged, otherwise there will be a turbid layer just beneath the glycerine.

On adding a few drops of dilute sulphuric acid to a mixture of equal parts of glycerine and distilled water, and then a little alcohol, the presence of lime or lead will be shown by a white precipitate. The latter is recognised by sulphydric acid, which turns the precipitate black.

Butyric acid is detected by mixing the glycerine with absolute alcohol and sulphuric acid of 66° B. On gently heating the mixture, the butyric ether is easily recognised by its agreeable odour.

Formic and oxalic acids are also found in glycerine, impurities which are of special importance to pharmacists.

They are detected as follows:—Equal volumes of glycerine and sulphuric acid, specific gravity 1.83, are mixed together. Pure glycerine does not give off any carbonic oxide gas; but if either of the acids mentioned is present, an evolution of that gas will be observed. To decide whether both acids are present, and if not, which one, some alcohol of 40° B. and 1 drop of sulphuric acid are added, and then gently heated. Formic ether (used in making essence of peaches) will be recognised at once by its characteristic odour, and proves the presence of formic acid. To another sample of the glycerine add a little solution of chloride of calcium (free from carbonate), when it will give a precipitate of oxalate of lime, if oxalic acid is present.

Sugar, glucose, dextrin, and gum are often used as intentional adulterations of glycerine, and are tested for as follows:—The glycerine is mixed with 150 or 200 drops of distilled water, and 3 or 4 centigrammes of molybdate of ammonia are added, and one drop of pure nitric acid. It is boiled about 30 seconds. If sugar or dextrin is present, the mixture will be blue.

Glycerine adulterated with cane sugar or syrup acquires a brownish-black colour when boiled with sulphuric acid. Glucose is detected by boiling it with caustic soda, which turns it brown.

If detected qualitatively, the quantity may be estimated by the following method:—5 grams of glycerine are weighed out and mixed with 5 cubic centimetres of distilled water. It is boiled in a little flask, with Barreswil's alkaline solution of tartrate of copper. The sub-oxide of copper is precipitated, and the precipitate dissolved again in hydrochloric acid. An excess of ammonia is added, and it is poured into a vessel containing an excess of nitrate of silver. A precipitate of metallic silver is formed and filtered out. It is washed with warm water and ammonia, calcined at a red heat, and weighed; 109.6 parts of metallic silver represent 100 of glucose.

If cane sugar or dextrin is found, it is boiled for half-an-hour with acidified water to convert these substances into glucose.

If none of these impurities are present, the amount of water is found by Vogel's well-known method.—*National Druggist*.

SILVER AND LEAD MINING IN BURMAH.

THE *Rangoon Times* observes that the short notice of silver and lead mining in Upper Burma in the last Administration Report is not satisfactory. "The Bawzaing silver and lead mines are situated in the Myelat. These mines were visited and reported on in September, 1888. They are situated about one mile north-east of the village of Bawzaing, on the slope of a small hill, and extend over about 100 yards square. The ore is usually found in small quantities, at a depth of about 10 feet, but the shafts descend to about 300 feet before the miners begin to follow up any veins. The mines appear to be rich, and the miners state that there is as much ore as they can work. The ore varies in quality, yielding from 25. to 105. weight of silver per basket of about 365 lb. The tools used in working the ore are a small hand-pick, a mallet, and a cold steel chisel. Two men take it in turns to pick at the rock, while others carry the ore to the surface. The process of extracting the metals from the ore is carried on close to the village of Bawzaing independently of the miners, who sell the rough ore at the pit's mouth. The furnaces used can each reduce about five baskets (1,825 lb.) of ore daily. Silver is sold at 8s. per ¼ lb. of weight, and the rolled lead at 3s. to 4s. per 100 viss (365 lb.). There are between 60 and 70 people employed at and living on the proceeds of the mines. The main profits were in former years derived from the sale of the lead, but the sale in Upper Burma being now forbidden, there is little or no demand for the metal. A considerable quantity of lead has accumulated at the pit-heads, and endeavours are being made to obtain a market for it in Rangoon for export to Europe. There are also lead and silver mines of about the same quality at Kyauklat." Commenting on this extract, the *Rangoon paper* expresses a hope that if no arrangements such as are spoken of in the report have been made, the local government will at once take steps to have the mines worked on their own account. "It seems hard that an industry which is said to be rich and profitable should be stopped because lead is not allowed to be sold in Burma. The metal is useful in many ways, and so long as dacoits are not supplied with the material for manufacture of bullets there seems no reason to put a stop to the working of the silver and lead mines from fear of them. The Government might arrange to purchase all the lead at the mines, and thus encourage an industry which it would seem has now been stopped."

Trade Notes.

A FATAL EXPLOSION OF AN OXYGEN CYLINDER occurred on the 2nd January at the Rosehill Works of the Scotch and Irish Oxygen Company, Polmadie. Whilst the foreman was in the act of carrying a cylinder, it unaccountably exploded with great force, injuring him fatally. Portions of the cylinder were afterwards found a quarter of a mile off, although fences had to be penetrated in their flight.

NATURAL GAS.—The news from Texas of a fresh discovery of natural gas is confirmed. It has been struck in a well 6½ miles from San Antonio, at a depth of 530 feet. That the discovery will affect the industry of the region goes without saying. Western Pennsylvania is not, as is generally supposed, the only region in the States where natural gas occurs. It is found also in Ohio, to the south of the west end of Lake Erie, and in Indiana, near the middle of the eastern frontier.

BURNING POWER OF STEAM.—The charred condition of the wooden coverings of the steam pipes recently exhumed by the New York Steam Power Company, in making way for the subways, after remaining for several years undisturbed, shows that even with such unfavourable surroundings as to moisture, &c., steam pipes are capable of actually burning wood. The question has often been discussed, but the evidence furnished in the case cited is very conclusive.—*Scienc. Ame.* Jan. 1890.

BAKU AND NEWCASTLE.—It may not be generally known that since the time Newcastle got to know about Baku, the "Queen City of the Caspian" has got to know about Newcastle. In other words, from this district are now sent large consignments of cable every year to Baku for use at the petroleum wells. This is quite a new trade, and one that we trust will continue. Russian oil is also brought here in turn to be used in batching hemp at the rope walks. Formerly whale oil was employed, but petroleum, being cheaper, has nearly destroyed the use of the latter, and Scotch agents that used to trade in whale oil at Dundee now deal almost entirely in the Russian article.

EXECUTION BY ELECTRICITY.—A Plattsburgh (New York) telegram to the *New York Herald* says:—The apparatus for electrical execution at Clinton Prison was tested on Saturday, in the presence of the State Commission. Harold P. Brown, the New York electrical engineer, conducted the test. A steer, weighing 450 lb., was first experimented on. Two wires leading from the dynamo were attached to its body—

one on the head and the other on the right flank. At the end of each wire was a water-soaked sponge. At a given signal Mr. Brown turned on a 900-volt current, and at the same instant the animal dropped dead. There was no appreciable interval between the turning on of the current and the animal's evidently painless death. Further tests of the machine with a Westinghouse dynamo and an alternating current were also satisfactory. This is the way the preparations for the execution will be made: An electro, covered with a wet sponge, will be placed on the top of the condemned man's head, and another in a large shoe on one of his feet. His arms will then be strapped across his breast, and a similar strap placed around his ankles. He will then be placed on the chair, the straps will be attached to hooks provided for the purpose, a button will be touched, and then all will be over.

THE TREATMENT OF SEWAGE.—In 1888 Sir Henry Roscoe issued a report based upon a number of careful experiments upon the action of the usual deodorants upon sewage. Since that date some further important experiments have been made in reference to Mr. William Webster's process of electrical treatment of sewage carried out at Crossness pumping station, and by which it is found that the process is capable of removing practically the whole of the matters in suspension, and an average of 22 per cent. of the the oxidisable organic matters in solution at a cost of £1. 15s. per million gallons of sewage, or £102,200. per annum for the whole of the daily flow of the 160 millions gallons of London sewage, exclusive of labour, interest on capital, wear and tear, etc., and the cost of disposing of the sludge.

SOUTH AFRICAN GOLD.—The returns of the export of raw gold from South Africa via Natal and Cape Colony during December, compiled by the Capetown Chamber of Commerce, have now reached us. The amount shipped via Natal during the month was £43,901., and the amount via Cape Colony was £87,870. The total for 1889 via Natal is £584,405., against £402,018. for 1888, and the total via Cape Colony is £857,366., against £516,886. for 1888. The total for both colonies for 1889 is £1,441,771., against £918,904. for 1888. The yield is beyond doubt increasing, though the total for December is not the largest monthly record, being only £131,771., against £144,338. in June last and £136,902. in July; but with these exceptions it beats any other month. The total value of the gold export for 1889 is, however, still only about one-third the value of the diamonds annually exported from the Kimberley mines.

THE "BAILEY-FRIEDERICH" STEAM MOTOR.—By invitation of Mr. Alderman W. H. Bailey, the head of the firm, a large number of members of the Arts Club and Brazenose Club and other gentlemen interested, paid a visit to the works of Messrs. W. H. Bailey and Co., in Oldfield-road, Salford, for the purpose of making an inspection of the "Bailey-Friederich" steam motor. The invention of a gentleman of Vienna, this motor is a steam engine and boiler in combination. It is an exceedingly compact piece of mechanism, and works, as was shown yesterday, automatically and noiselessly. The furnace enables coal, coke, tanners' bark, or any other kind of fuel to be used, and it is claimed for it that it requires less fuel and a great deal less water than any other form of steam motor. This economy in the consumption of fuel is secured by the heat of the exhaust steam being utilised by the condenser, and by the very great heating surface which is obtained in consequence of the peculiar construction of the furnace. The inventor and Mr. Bailey—by whom some minor improvements have been introduced—are hopeful that the use of the motor may solve the question of the introduction of the electric light into moderate-sized houses, as it is estimated that 40 16-candle power incandescent lamps can be kept supplied at a cost of about 6d. per night for fuel. In Continental countries, where coal is less abundant and therefore more costly than with us, the economy of fuel which the motor effects has already brought it into extensive use, and now it is being brought under notice in this country. At Messrs. Bailey's works, by the use of one of the motors, 40 16-candle power lamps are kept going at a cost of 1d. per hour.—*Manchester Guardian*.

MAKING GLASSWARE BY MACHINERY.—The manufacture of glassware by machinery on a permanent scale has been undertaken at the long-idle Ellenville (N. N.) Glass Works in the village of that name. When it was reported that a machine for blowing glass bottles had been invented and successfully worked in England, a company of American glass manufacturers was formed with a view of introducing the machines in this country, and one of the members was sent over there to examine and report upon the merits of the invention. The machine as now fitted up will blow quart bottles only. It is operated by a man and boy, and is very simple of construction. It consists of an iron upright, around which revolve arms fitted with moulds for shaping the glass. A pipe supplied with a current of air and readily manipulated by the operator does the work of blowing. The machine is operated with astonishing celerity, and is said to be capable of turning off 100 dozen of perfect bottles a day. Three glass workers at Martin's Ferry, O., have invented a machine which they claim will radically change the method heretofore employed in pressing glassware. It is claimed that by the use of this machine pressed ware can be made to look as well as blown ware.

Market Reports.

THE LIVERPOOL MINERAL MARKET.

Our market has well maintained its previous advance, and for some minerals still higher prices have been paid. Manganese: Arrivals have been very small, whilst stocks have been further drawn upon, and sales have been made at much higher prices, both for prompt and forward delivery. Magnesite: Raw lump without change, raw ground, £6. 10s., and calcined ground, £10. to £11. Bauxite (Irish Hill brand): In increasing demand, selling freely at full prices. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have improved a little, but prices remain firm and unaltered, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d.; good medium, 30s.; medium 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone steady; ground at £10., and specially selected lump, finest quality, £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 16s. to 18s. Purple ore, unchanged. Spanish manganiferous ore commands ready sale at full prices. Emery-stone: Best brands in good demand, bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda and tungsten metal more inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High percentage inquired for at fair prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: The miners' strike has terminated, but prices are still firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native) £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand sought after, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore more inquired for—22s. to 25s. Plumbago: More offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese sells easily at advanced figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

In the paraffin section a rather important arrangement has just been concluded (taking effect from February 1st.), whereby the Scotch and American producers of scale and wax conjointly are to charge about a halfpenny a pound more for their output, the compact to last as thus readjusted till the end of January 1891. The advances thus artificially brought about consist of $\frac{3}{4}$ ths of a penny for soft scale (commonly termed "match paraffin" in the manufacture), for hard scale $\frac{1}{2}$ ths, and for paraffin wax 120° semi-refined $\frac{3}{4}$ nds. At the same time, also by agreement, the Associated Candle Makers of England and Scotland (amongst which most of the Scotch oil companies are classed), advance their finished products one halfpenny per pound. This agreement will add largely to the gross revenue of these Scotch Companies, but, already a good part of it is in reality discounted by recent rises in the costs of production. The general market for chemicals has improved slightly, and most quotations are firmer. Sulphate of ammonia is an exception, being easier, and very idle, buyers offering about £11. 12s. 6d. at which low mark, however, no sales are on report. The local feeling in bleaching powder is stronger, and holders look for better prices. During the week bichromates have been rather less in demand. Chief prices current are:—Soda crystals, 49s. net Tyne; alum in lump £4. 17s. 6d., less $2\frac{1}{4}$ % Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1 $\frac{1}{4}$ d. less $2\frac{1}{4}$ % Tyne; caustic soda, white, 76°, £10., 70/72°, £8. 5s., 60/62°, £7. 7s. 6d., and 60/62° cream, £6. 15s., all less $2\frac{1}{2}$ % Liverpool; bicarbonate of soda, 5 cwt. casks, £5., and 1 cwt. casks, £5. 5s. net Tyne; refined alkali 48/52°, 1 $\frac{1}{2}$ d., less 5% Tyne; saltcake, 25s. 6d. to 26s. 6d.; bleaching powder, £5. 15s. to £6. less 5% f.o.r.

Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4 $\frac{1}{4}$ d., less 5% any port; nitrate of soda 8s. 3d. to 8s. 6d.; sulphate of ammonia, £11. 12s. 6d. to £11. 15s. f.o.b. Leith; salammuniac; 1st and 2nd white, £37. and £35., less $2\frac{1}{2}$ % any port; sulphate of copper, £25. less 5% Liverpool; paraffin scale, hard, 2 $\frac{1}{2}$ d., soft, 2 $\frac{3}{4}$ d.; paraffin wax, 120°, semi-refined, 3 $\frac{1}{2}$ d.; paraffin spirit (naphtha), 9d.; paraffin oil (burning), 6 $\frac{1}{4}$ d. to 7d., at Glasgow; ditto (lubricating), 86s°, £5. 10s. to £6., 88s°, £6. to £6. 10s.; and 890/895°, £7. 10s. to £8. Week's imports of sugar at Greenock were 27,295 bags.

MISCELLANEOUS CHEMICAL MARKET.

There has been an excited market during the past week in caustic soda, which on the spot is now worth for 70% £9. per ton, and for 60% £8. per ton, f.o.b., Liverpool. The future of this article is somewhat uncertain, and meanwhile the makers are not willing to book far ahead. It is not unreasonable to expect an increase in the prices of this product, inasmuch as it is most directly affected by the advances in salt and fuel. Recent curtailments of production have brought about the present rise in values, and if makers continue to work upon the same lines, it is not at all unlikely that even the present prices will be maintained. Soda ash is holding a firm position at 1 $\frac{1}{4}$ d. to 1 $\frac{1}{2}$ d. per deg., and soda crystals are naturally in sympathy with the latter and firm at £2. 12s. 6d. on rails. Bleaching powder continues steady in price at £5. 2s. 6d. to £5. 5s., on rails at works, and £5. 12s. 6d. to £5. 15s. f.o.b. in export casks. Chlorate of potash, steady at 6 $\frac{1}{4}$ d. Sulphur in all grades is finding ready outlet at current rates. Sulphate of copper is scarce and firm in price at £24. 10s. to £25. per ton. Lead salts of all kinds are still slow of sale, but prices are unaltered. There is brisk demand in all quarters for green copperas, which is scarce and higher in price generally. Ammonia salts are rather quiet, with the exception of salammuniac, which is in brisk demand at the advanced prices. Carbolic acid crystals are only moving slowly, and present quotations are nominally 10 $\frac{1}{2}$ d. to 10 $\frac{3}{4}$ d. per lb. for 34/35°. There is a fair ready sale for cresylic acid of well-rectified quality, at 1s. to 1s. 3d. per gallon. Potash, caustic and carbonate, are firm, and there is moderate demand. Prussiate of potash still scarce and firm at 10d. to 10 $\frac{1}{2}$ d. per lb.

THE LIVERPOOL COLOUR MARKET.

COLOURS quiet; prices unaltered. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £24. 10s. to £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

TAR AND AMMONIA PRODUCTS.

TUESDAY.

The Benzol market has not maintained its firmness, and prices to-day are just a trifle weaker, 90's being value for 3s. 11d. to 4s., and 50/90's 3s. 2d. to 3s. 3d. There is, however, not any very great change, and sellers will do well to watch the market carefully. The demand for solvent naphtha continues to increase, and prices are still advancing. We hear that consumers who have not covered their requirements are being asked 2s. for good solvent for prompt delivery. Creosote is still moving off well, and though prices have not advanced from last week's quotations, yet there seems to be some difficulty in consumers getting regular supplies. The crude carbolic acid market still continues in an unsatisfactory state, though many attribute this to the "bear" attitude of several purchasers. It is quite certain that carbolic acid is being used as largely as ever, and hence the difficulty of accounting for the flat state of the market. Anthracene is perhaps a trifle weaker, and 1s. 2 $\frac{1}{2}$ d. to 1s. 3d. may be considered to-day's value. Pitch is weak, and there is not much business doing, but prices are maintained in the meantime.

The sulphate of ammonia market remains *in statu quo*, though attempts are being made to "bear" prices to an extraordinary extent. Hull is quoted at £11. 13s. 9d., and Leith at £11. 12s. 6d., but we have not been able to hear of any actual transactions at these prices. London is also quoted £11. 17s. 6d., and Beckton £11. 15s., but sellers will require to be very cautious in their transactions, as these prices are not warranted either by the business which is being done, or the opinions of purchasers on the Continent. It is well known that several speculators have largely oversold themselves for this month's delivery, and the "bear" operations have been devised for shifting their losses on to the shoulders of the manufacturer. The demand for sulphate all the world over has not abated one iota, and there is no reason at all why prices should be any lower than they were at this time last year.

REPORT ON MANURE MATERIAL.

There has been a moderate business throughout the week in manure material, with no great alteration in values, except that nitrate of soda has recovered somewhat, owing to further negotiations among producers to curtail their output or to stop their works altogether for a time.

Charleston River phosphate rock continues to be quoted 11d. per unit, cost, freight, and insurance to United Kingdom in cargoes, but it is not freely offered, and we do not hear of any important business passing. Somme 55.60 % is worth 10d., 60/65 % 11½d., 65/70 % 13d., per unit, 3th rise, in cargoes, c.i.f. to United Kingdom in bulk, and Belgian 40/45 % 8d., and 48/53 % 10d. per unit, c.i.f., in bulk, in cargoes to United Kingdom. There is a moderate business passing in these descriptions. We do not hear of anything doing in Canadian Rock, values being nominally as quoted in our last report.

A moderate amount of business is passing in bones and bone meal, though the attitude of manure manufacturers is rather to hold off until they see their manures going out, before they complete their purchases of material for the coming season. River Plate cargoes of bones, December shipment, are worth about £5. 10s., and later shipments would hardly fetch as much. Crushed East Indian bones have been sold during the week at £5. 5s. to arrive, and that price has, we understand, been accepted for meal, but at the close the nearest value is £5. 7s. 6d. for meal, and £5. 5s. for crushed bones, shipment ahead. From store, £5. 10s. to £5. 12s. 6d. required. There has been more enquiry within the past few days, and there are prospects of an improvement in values.

Nitrate of soda cannot now be had under 8s. 6d. on spot. Due cargoes are worth 8s. 4½d. to 8s. 6d., and November shipment might fetch a little more though the attitude of both buyers and sellers is rather in the direction of waiting to see what comes of the producers' present negotiations for the reduction of the output.

The demand for superphosphates continues, and 26 % may still be quoted 50s. in bulk, f.o.r. at works.

Dried blood is somewhat easier, and 11s. per unit would probably buy River Plate shipments now on the way and shortly due. Home prepared is quoted 11s. 6d. per unit f.o.r. at works.

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	56 1½	....	52 10½
Tin.....	£94 0 0	....	£93 12 6
Copper.....	48 17 6	....	48 17 6
Spelter.....	24 2 6	....	23 0 0
Lead.....	13 0 0	....	12 17 6
Silver.....	44 ½	....	44 ½

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto.....	16 ½	16 ½	16 ½
Mason & Barry....	6 ¾	6 ¾	6 ¾
Tharsis.....	4 ¾	4 ¾	4 ¾
Cape Copper Co. ..	3 ½	3 ½	3 ½
Namaqua.....	2 ½	2 ½	2 ½
Copiapu.....	2 ½	2 ½	2 ½
Panulcillo.....	1 ½	1 ½	1 ½
New Quebrada....	¾	¾	¾
Libiola.....	3 ½	3 ½	3 ½
Tocopilla.....	1 9	2 3	1 6
Argentella.....	6d.	1/-	6d.

New Companies

GRINDLEY AND COMPANY, LIMITED.—This company ult., with a capital of £20,000., in £5. shares, to take over business of tar, rosin, and naphtha distillers, and of pitch varnishes, disinfectant, sheep dip, creosote, asphaltum jelly manufacturers, carried on at Upper North-street, Company. The subscribers are:

W. F. Rolfe, Barchester-street, Poplar, felt manufacturer.
J. Smart, Stevenage, Herts., asphalt manufacturer.
W. S. Duff, 32, Etchingham-road, Leyton-road, E.
J. Grindley, Millfield, Highgate, merchant.....
F. Ramel, 36, Graham-road, Dalston.....
J. J. Patrick, 174, Burdett-road, E., commercial traveller.
T. W. Holmes, 9, Westbourne-road, Barnsbury, clerk.

NORWICH ELECTRICITY COMPANY, LIMITED.—This company ult., with a capital of £50,000., in £10. shares, to take over elsewhere the business of an electricity company in all

are:
G. Fowell Buxton, Thorpe, Norwich.....
A. R. Chamberlin, Ipswich-road, Norwich.....
J. Bugg Coaks, Thorpe, Norwich.....
R. J. Colman, Beacondale-woods, Norwich.....
C. K. Gilman, Eaton, Norwich.....
F. W. Harmer, Cringleford, Norfolk.....
G. B. Kennett, Norwich.....

PARAGON SMOKE PREVENTOR COMPANY, LIMITED.—This company registered on the 29th ult., with a capital of £3,000., to take over patents for improvements in the manufacture of mechanical the prevention or consumption of smoke. The subscribers are:
W. P. White, 29, Bold-street, Manchester, engineer.
C. H. Sidebottom, 15, Cromford-court, Manchester, b.
W. H. Cottrell, Bolton, commercial traveller.....
J. Whittaker, Accrington, engineer.....
J. Heythornthwaite, Church, potato merchant.....
W. Kitchen, Accrington, licensed victualler.....
A. Dewhurst, Church, boiler maker.....

Gazette Notice

PARTNERSHIPS DISSOLVED

J. J. THOMAS and SON, Rochdale, chemists and drug manufacturers.
SALTER and SQUIRE, Washington, Durham, and Wylam, and slag merchants.
BLAKEY and PETERS, Leeds, oil refiners, soap manufacturers.

The Patent List

This list is compiled from Official sources in the Laboratory, under the immediate supervision of Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT

Rotary Motor Engines, etc. J. Roots. 570. January 13.
Manures. M. C. Ginster. 575. January 13.
Dry Gas Meters.—(Complete Specification.)—J. T. Wy. 598. January 13.
Brushes for Dynamos. J. C. Mewburn. 600. January 13.
Filter Presses. J. Brock and T. Minton. 606. January 13.
Electric Motors. R. Peacock and H. L. Lange. 607. January 13.
Manufacture of Glass Bottles. W. C. Bennett. 612. January 13.
Regulators for Electric Currents. R. B. Evered. 613. January 13.
Preservation of Wood. F. T. P. Wells. 617. January 13.
Steam Generators. J. T. Thornycroft. 645. January 13.
Pulverizing Mills.—(Complete Specification.)—M. B. 648. January 13.
Filters.—(Complete Specification.)—E. M. Knight. 648. January 13.
Rock Breakers.—(Complete Specification.)—M. B. Dod. 649. January 13.
Soaps. J. Templeman. 656. January 14.
Reversible Electric Motors. P. J. R. Crampton. 66. January 14.
Ageing Liquors. W. P. Thompson. 667. January 14.
Separators. J. S. Rigby and J. R. Wyld. 668. January 14.
Ascertaining the Requisite Time of Exposure in Photography. Ballard. 669. January 14.
Purifying Salt.—(Complete Specification.)—A. Domei. 670. January 14.
Elevators. L. Apostoloff. 676. January 14.
Accelerating Fermentation. E. Edwards. 678. January 14.
Gas or Oil Motor Engines. F. W. Crossley. 684. January 14.
Electric Motors.—(Complete Specification.)—S. C. C. 684. January 14.
Illuminants for Electric and other Lamps. J. Cle. 684. January 14.
Gas Burners.—(Complete Specification.)—H. H. Lake. 684. January 14.
Pulverizing Mills.—(Complete Specification.)—H. H. 684. January 14.
Hydrocarbon Burners.—(Complete Specification.)—J. 684. January 14.
Addition of Smoke Consuming Chambers to Furnaces. 712. January 15.

Explosives. F. Y. Wolsley and H. R. Puchon. 715. January 15.
 Red Dyes. J. J. Hummel. 724. January 15.
 Pressure Gauges. W. Clifford. 731. January 15.
 Boiler Flues. B. Brown. 732. January 15.
 Dioxynaphthalene-mono-sulpho Acid. A. Bang. 735. January 15.
 Bridge Protector for Furnaces. W. McG. Greaves. 745. January 15.
 Generation of Electricity by Gas Batteries.—(Complete Specification) O. Dahl. 761. January 15.
 Heating, Cooling, or Condensing. J. H. Selwyn. 762. January 15.
 Telephones. W. Oesterreich and W. Genest. 771. January 15.
 Obtaining Alumina and Phosphoric Acid from Phosphates of Alumina. H. H. Leigh. 789. January 15.
 Machinery for Rolling Glass. Chance Bros. and Co., Limited, and E. F. Chance. 785. January 15.
 Apparatus for Washing Gas. W. W. Horn. 788. January 15.
 Manufacture of Alcohol. G. Guignard and A. Hédouin. 792. January 15.
 Carburetting Gas. H. S. Maxim and G. S. Sedgwick. 794. Jan. 15.
 The Utilisation of Peat, Sawdust, etc. R. Stone. 795. January 15.
 Steam Boiler Furnaces. W. Truswell. 811. January 16.
 Preservative Composition. W. H. Ness and W. C. Folkard. 812. Jan. 16.

Filters. A. Smith. 828. January 16.
 Manufacture of Glass Vessels. H. L. Phillips. 830. January 16.
 Manufacture of Ammonium Nitrate, and Sulphate, or Chloride of Sodium, and of Potassium. W. White. 850. January 16.
 Gas or Vapour Burners. T. W. Johnson. 863. January 16.
 Fire Extinguishers. J. G. Lorrain. 864. January 16.
 Vapour Generators. G. W. Garrett. 870. January 17.
 Dynamos. J. Perry. 872. January 17.
 Dynamos. J. Swinburne. 878. January 17.
 Sheep Dip. G. Craig. 889. January 17.
 Insulating and Waterproofing Composition. A. N. Ford. 893. Jan 17.
 Air Compressing Machines. J. C. Mewburn. 894. January 17.
 Dyeing Vats. E. Charles. 903. January 17.
 The Electro-deposition of Metallic Alloys. W. A. Thoms. 907. Jan. 17.
 The Distillation of Coal. E. Freund. 910. January 17.
 Enclosed Fireplaces. G. C. Kendal. 931. January 17.
 Manufacture of Caustic Soda. W. Feld. 931. January 18.
 Dynamos.—(Complete Specification). W. Thompson. 950. January 18.
 Oil Burners for Furnaces. G. S. Grimston. 952. January 18.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Jan. 18th.

Acetic Acid—

Holland, £21 Phillips & Graves
 Germany, 40 pkgs. Pickford & Co
 Holland, 10 A. & M. Zimmermann
 " 190 Beresford & Co.

Antimony Ore—

Spain, 14 t. H. Bath & Son
 U. S., 16 F. Haerberlin
 France, 10 Pillow, Jones, & Co.
 Spain, 30 F. Williams
 Sydney, 11 W. Caudery & Co.

Bones—

U. S., 27 t. H. A. Lane & Co.
 Victoria, 8 Culverwell, Brooks, & Co.
 E. Indies, 50 Goad, Rigg & Co.
 N. S. Wales, 1 t. 7 c. " "
 " 7 17 " "
 N. Zealand, 7 Flack, Chandler, & Co.

Bone Ash—

France, 5 c. Arnati & Harrison

Barytes—

Germany, 22 cks. O'Hara & Hoar
 " 57 T. & W. Farmiloe
 " 23 O'Hara & Hoar
 " 56 W. Harrison & Co.
 Belgium, 12 J. L. Lyon & Co.
 " 134 A. Zumbach & Co.
 " 153 pkgs. W. Harrison & Co.
 Germany, 19 cks. W. G. Taylor & Co.

Brimstone—

Italy, 250 t. Brandram, Bros., & Co.
 " 200 W. C. Bacon, & Co.
 " 150 G. Ward & Sons

Cabutchoune—

E. Indies, 2 t. 5 c. Matheson & Co.
 E. Africa, 45 L. & I. D. Jt. Com.
 E. Indies, 16 Knighton & Co.
 " 8 L. & I. D. Jt. Com.
 E. Africa, 10 Clarke & Smith
 U. S., 3 J. Patton

Chemicals (otherwise undescribed)

Germany, £23 F. H. Lee
 " 93 " "
 " 15 L. & I. D. Jt. Com.
 France, 14 Carey & Sons
 Germany, 23 Phillips & Graves
 " 357 A. & M. Zimmermann
 " 138 T. H. Lee

Cream Tartar—

Spain, 4 pkgs. C. Christopherson
 & Co.
 Holland, 11 Middleton & Co.

Camphor—

Japan, 66 tubs. Lewis & Peat
 China, 35 L. & I. D. Jt. Com.
 Germany, 3 " "
 Japan, 90 May & Baker

Copper Precipitate—

Spain, 66 t. G. Ward & Sons

Copper Regulus—

Sydney, 78 t. H. Rogers, Sons, & Co.
 Adelaide, 26 Johnson, Matthey, & Co.

Caustic Potash—

France, 8 pkgs. F. W. Berk & Co.

Carbonic Gas—

Holland, 110 pkgs. Phillips & Graves

Copperas—

Germany, £30 Burgoyne, Burbidge, & Co.

Cobalt—

New Caledonia, 1 t. Gellatly & Co.

Dyestuffs—

Cochineal
 Canaries, 10 pkgs. W. M. Smith & Sons
 " 13 Johnson, Rolls, & Co.
 " 15 H. R. Toby & Co.
 " 1 Kuhner, Hendschel, & Co.
Tanners' Bark
 Belgium, 50 t. Hicks, Nash, & Co.
 N. S. Wales, 94 J. Swire & Sons
 Victoria, 17 Newcomb & Son
 New Zealand, 92 W. H. Boulton

Indigo

E. Indies, 57 cts. L. & I. D. Jt. Co.
 " 31 Arbutnot, Latham, & Co.
 " 10 Benecke, Souchay, & Co.
 " 5 W. Brandt, Sons, & Co.
 " 18 T. D. Brand
 " 13 Elkan & Co.
 " 5 Darling Bros.
 " 12 P. & O. Co.
 " 8 G. Dards
 " 7 J. Owen
 " 131 1 bx. Elkan & Co.
 " 125 P. & O. Co.
 " 160 L. & I. D. Jt. Co.
 " 8 Frauling & Gaskell
 " 38 T. Barlow & Bros.
 " 84 T. Ronaldson & Co.
 " 10 Henderson Bros.
 " 15 Elkan & Co.
 " 1 Anderson Bros.
 " 9 Williams, Torrey, & Co.
 " 47 Phillips & Graves
 " 113 L. & I. D. Jt. Com.
 " 4 E. Bower & Co.
 " 25 Patry & Pasteur
 " 10 Parsons & Keith
 " 61 Elkan & Co.
 " 12 F. Huth & Co.
 " 23 H. Grey, junr.
 " 31 J. Owen
 " 10 Elkan & Co.
 " 22 Langstaff & Co.

Extracts

U. S., 20 pkgs. H. Johnson & Co.
 E. Indies, 350 T. Ronaldson & Co.

Oreochella

E. Africa, 228 pkgs. Phillips & Graves

Anatto

Ceylon, 30 pkgs. Hoare, Wilson, & Co.
 " 5 " "

Sumac

Italy, 500 pkgs. C. E. Fosbrooke
 " 1,000 I. Kitchen
 " 750 C. E. Fosbrooke
 " 350 W. France

Saffron

Spain, 1 pkg. Mancha & Co.
 " 2 W. Balchin

Safflower

E. Indies, 30 pkgs. L. & I. D. Jt. Co.

Myrabolams

E. Indies, 67 pkgs. Arbutnot, Latham, & Co.

Gambler

E. Indies, 95 pkgs. L. & I. D. Jt. Co.
 " 214 Lewis & Peat

Rennet

Denmark, 13 cs. A. F. White & Co.

Valonia

A. Turkey, 100 t. J. Graves
 " 68 A. & W. Nesbitt

Glycerine—

S. Australia, £90 H. Hill & Sons
 Germany, 350 Prop. Scott's Wf.
 " 360 Beresford & Co.
 Victoria, 226 " "
 Germany, 60 T. H. Lee
 " 17 Craven & Co.
 " 64 A. & M. Zimmermann
 N. Z., 70 Hicks, Nash, & Co.

Guano—

Sweden, 70 t. Matthews & Luff
 " 170 " "
 Lobos de Afuna, 1,200 t. Anglo
 " Cont. Guano Wks.
 Sweden, 72 t. Anglo Swedish Co.

Glucose—

Germany, 40 pkgs. 313 cwt. T. J. Warer
 " 120 120 Barrett,
 " 100 100 Tagant, & Co.
 " 100 100 J. Barber & Co.
 " 10 82 Props.
 U. S., 2,500 2,500 Chamb. Wf.
 " J. R. Francis
 Germany, 500 500 M. D. Co.
 " 20 161 Leach & Co.
 " 2 15 L. & I. D. Jt. Co.
 " 200 200 L. Sutro & Co.
 " 15 120 Hyde, Nash, & Co.

Glucose (continued).

Germany 200 pkgs. 200 cwt. J. F. Ohlmann
 " 600 600 F. Barber & Co.
 " 50 400 T. M. Duché & Sons
 " 60 60 H. Lorenz
 " 10 55 Props.
 " 60 60 Chamb. Wf.
 " 17 140 H. Lorenz
 U. S., 200 200 H. Barrett,
 " 550 550 Tagant, & Co.

Gutta Percha—

B. W. I., 49 c. D. Baird & Co.
 E. Indies, 565 Kleinwort, Sons, & Co.

Isinglass—

E. Indies, 12 pkgs. L. & I. D. Jt. Co.
 Vancouver's Isld., 8 pkgs. Hudson's Bay Co.
 N. Russia, 8 J. Vickers
 China, 3 W. M. Smith & Sons

Manure—

Phosphate Rock

France, 120 t. T. Farmer & Co.
 Belgium, 380 Anglo Contl. Guano Works Agency.
 " 100 Sawyer, Mead, & Co.
 Holland, 162 Lawes Manure Co.
 Aruba, 487 G. M. Bauer
 Germany, 4 Petri Bros.

Superphosphate

Holland, 100 t. Lawes Manure Co.
Manure (otherwise undescribed)
 Germany, 5 t. Union Lighterage Co.
 " 6 N. S. S. Co.
 " 50 Hunter, Waters, & Co.
 " 256 J. Gibbs

Naphtha—

10 brls. Eister & Biggs

Nitre—

Chili, 9,985 bgs. Anglo Contl. Guano Works

Potassium Prussiate—

Germany, 16 pkgs. A. & M. Zimmermann.
 " £23 " "

Potassium Carbonate—

France, £23 Beresford & Co.

Paraffin Wax—

U. S., 470 brls. H. Hill & Sons

Pitch—
Germany, 54 brls. Berlandina, Bros., & Co.
San Sebastian, 29 brls. "

Potassium Sulphate—
France, 21 pkgs. Friedrichstadt
Germany, 305 Carey & Sons
Germany, 21 G. M. Bauer
France, 27 W. V. Robinson & Co.
C. Pawson

Plumbago—
Holland, 92 cks. Brown & Elmslie
Ceylon, 701 J. Thresher, Son, & Co.
" 713 H. W. Ison
" 394 Marshall & French
" 125 H. J. Perlbach & Co.
" 1,210 H. W. Ison

Pyrites—
Spain, 1,412 t. G. Ward & Sons
" 400 F. C. Hills & Co.
" 200 Anderson, Anderson, & Co.

Potash Salts—
Germany, £59 Howard & Sons

Potassium Bicarbonate—
Holland, 14 pkgs. A. & M. Zimmermann

Potassium Muriate—
Germany, 305 pkgs. Odum's Cheml. M. Co.

Quinine—
Holland, £1,250 F. W. Heilgers & Co.

Saltpetre—
Germany, 25 brls. 120 cks. P. Hecker & Co.
E. Indies, 35 cks. 1,122 bgs. L. & I. D. Jt. Com.
" 982 bgs. Henckell du Buisson
" 286
" 1,106 Henderson Bros.
" 400 Ralli Bros.
" 181 C. Wimble & Co.
Germany, 50 cks. T. Merry & Son
" 41 J. Hall & Son

Stearine—
Germany, 33 cks. W. Balchin
France, 145 sks. J. Goddard & Co.

Sodium Acetate—
France, £85 Hunter, Waters, & Co.

Sodium Prussiate—
Holland, £46 Spies, Bros., & Co.

Sal ammoniac—
Germany, £17 Hening & Co.

Tartaric Acid—
Italy, 40 pkgs. Webb, Warter, & Co.
France, 19
Holland, 7 Middleton & Co.
" 10 Webb, Warter, & Co.

Tar—
Germany, 46 brls. Linck, Moeller, & Co.

Tartar—
Italy, 25 pkgs. Thames S. Tug Co.

Turpentine—
U. S., 504 brls. Nicholl & Knight
" 250 Game, Bowes, & Co.

Ultramarine—
Holland, 6 cs. W. Harrison & Co.
" 3 H. Peron & Co.
Belgium, 8 cks. Leach & Co.

Zinc Oxide—
Holland, 2 cks. W. Bennett
" 250 N. Smith
" 175 M. Ashby
Germany, 10 D. Storer & Sons

Zinc Sulphate—
Germany, 43 pkgs. Howard & Sons
" £70 F. Smith

LIVERPOOL.

Week ending Jan. 22nd.

Boracic Acid—
Leghorn, 40 cks.

Borax—
Leghorn, 10 cs.

Bones—
Constantinople, 173 bgs. Jivan, Tekeian, & Co.

Monte Video, 2 bgs.
Karachi, 4,000 Ralli Bros.
Maraham, 128 R. Singlehurst & Co.
Ceara, 1,252 "

Bone Ash—
Rio Grande do Sul, 181 t. A. Tesdorpf & Co.

Borate of Lime—
Valparaiso, 1,430 cks. Cockbain, Allardice, & Co.
" 705

Barytes—
Ghent, 43 brls.
Antwerp, 40 bgs.

Carbonate—
New York, 50 brls. Meade-King, & Robinson

Copper Ore—
Salaverry, 78 bgs. Bates, Stokes & Co.

Cream Tartar—
Tarragona, 13 cks.

Caoutchouc—
Ceara, 21 bgs. Gunston, Sons, & Co.
" 58 Leech, Harrison, & Co.
" 111 Rosing, Bros., & Co.
" 42 Bieber & Co.
" 1
Accra, 5 F. & A. Swanry
" 1 L. Hart & Co.
" 3 Hutton & Co.
C. C. Castle, 8 brls. 1 ck. Fletcher & Fraser
" 1 hd. 6 brls. Ellis & Co.
" 20
" 1 cs. A. Reis
" 1 C. L. Clare & Co.
Monravia, 1 brl. Hart & Co.
" 2 cks. Brierley & Co.
Sierra Leone, 1 brl. N. Waterhouse & Co.
" 5
" 1 brl. A. Herschell
Sherbro, 1 brl. 1 bg. Comp. Tran.
" 2 Paterson Zochoms

Dyestuffs—
Extracts
Havre, 110 cks. Cunard S.S. Co., Ltd.
New York, 5 brls.
Annatto
Bordeaux, 25 cks.
Myrobolams
Bombay, 2,974 bgs.
" 1,906 Beyts, Craig & Co.
" 700 E. D. Sassoon & Co.
" 667 Arbuthnot, Ewart & Co.
Sumac
Palermo, 100 bgs. J. Kitchen
" 900
Valonia
Syra, 298 bgs. A. C. Cozzifachi
" 543 C. G. Nicolaidis
Smyrna, 115 bgs. G. T. Scrin
" 410
Indigo
Calcutta, 51 chts.
" 139 1 bx.
Cochineal
Gd. Canary, 9 bgs. Lathbury & Co.
" 20 J. Walker & Co.
Teneriffe, 8 sks. E. Posselt & Co.

Glycerine—
Antwerp, 24 cks.

Glucose—
New York, 200 brls. Schoellkopf & Hartford
" 26

Horn Piths—
Rio Grande do Sul, 5,100 t. A. Tesdorpf & Co.
Ceara, 148 bgs. R. Singlehurst & Co.

Iodine—
Valparaiso, 19 brls. A. Gibbs & Son
" 36 W. & J. Lockett

Pitch—
Amsterdam, 7 cks.

Paraffin Wax—
New York, 100 brls. Makin & Bancroft

Pyrites—
Huelva, 1,404 t. Matheson & Co.

Phosphates—
Ghent, 600 bgs.

Quinine—
Havre, 47 pkgs. Cunard S.S. Co., Ltd.

Stearine—
Boston, 36 hds.

Tartar—
Naples, 3 cks.
Valparaiso, 3 bgs.

Tartaric Acid—
Bilbao, 16 brls.

Verdigris—
Bordeaux, 2 cks.

Zinc Oxide—
Antwerp, 80 brls.

Zinc Ashes—
Genoa, 1 brl.
Antwerp, 95

GLASGOW.

Week ending Jan. 23rd.

Acetate of Lime—
New York, 200 bgs.

Blood Albumen—
Rotterdam, 7 cks. J. Rankine & Son

Barytes—
Rotterdam, 136 cks.

Chemicals (otherwise undescribed)
Hamburg, 2 cs.

Copper Ore—
Hommelvik, 100 t.

Dyestuffs—
Alizarine
Rotterdam, 32 cks. J. Rankine & Son

Dextrine
Hamburg, 30 bgs.

Glucose—
Hamburg, 10 cks.

Manganese—
Rotterdam, 4 cks. J. Rankine & Son

Pyrites—
Huelva, 1,625 t. Tharsis Co., Ltd.

Saltpetre—
Rotterdam, 7 cks. J. Rankine & Son

Ultramarine—
Rotterdam, 5 cs. J. Rankine & Son

GRIMSBY.

Week ending Jan. 18th.

Albumen—
Antwerp, 16 pkgs.
Hamburg, 13 cks. 2 cs.

Dyestuffs (otherwise undescribed)
Antwerp, 5 pkgs.

HULL.

Week ending Jan. 21st.

Acid (otherwise undescribed)
Rotterdam, 1 ck.

Chemicals (otherwise undescribed)
Hamburg, 68 pkgs. 100 bgs. Wilson, Sons, & Co.

Antwerp, 94
Rotterdam, 6 7 cks. W. & C. L. Ringrose

Stettin, 1 cs. Wilson, Sons, & Co.
Leghorn, 1 ck.
Genoa, 7 "

Caoutchouc—
Hamburg, 1 cs. C. M. Lofthouse & Co.

Dyestuffs—
Alizarine
Rotterdam, 69 pkgs. W. & C. L. Ringrose

Rotterdam, 56 cks. Hutchinson & Son

Valonia
Rotterdam, 12
Dextrine
Stettin, 90 b
Rennet
Copenhagen,

Glucose—
Hamburg, 60
" 700
" 200
Stettin,

Manure—
Ghent, 270

Potash—
Dunkirk, 30
Rotterdam, 24

Phosphate—
Dunkirk, 1,000

Saltpetre—
Hamburg, 6 br

Sulphur Ore—
Seville, 1,020 t.

Stearine—
Rotterdam, 15

Tar—
Pillau, 10
Marseilles, 25

Turpentine—
Libau, 50

Ultramarine—
Rotterdam, 5 c
" 2 c

Waste Salt—
Hamburg, 200 t

Zinc Oxide—
Rotterdam, 25 c

GO.

Week end

Alum—
Rotterdam, 31

Acetic Acid—
Rotterdam, 10

Dyestuffs—
Alizarine
Rotterdam, 30

Dyestuffs (ot
Boulogne, 30

Glucose—
Hamburg, 72

Potash—
Hamburg, 13
Calais, 34
Dunkirk, 25

Phosphate—
Ghent, 80

Potassium—
Boulogne, 2 ck

Sugar of Lead
Hamburg, 19 ck

Sodium Silica
Hamburg, 9

Saltpetre—
Rotterdam, 200

Waste Salt—
Hamburg, 525

Zinc Oxide—
Antwerp, 20

TYNE.		Bones—		Copper Regulus—		Sulphur Ore—	
<i>Week ending Jan. 23rd.</i>		Randers, 7 cks.		Huelva, 45 t.		660	
Alum Earth—		Copper Precipitate—		Glucose—		Pomaron, 2,100 t.	
Hamburg, 18 cks.	Tyne S. S. Co.	Pomaron, 2,750 bgs.		Hamburg, 7 cks. 100 bgs.		1,160	
Barytes—		Huelva, 1,906		Pyrites—		Salt—	
Rotterdam, 86 cks.	J. Robinson & Sons	" 4,452		Huelva, 1,391 t.		Hamburg, 101 bgs.	
				Scott Bros.		Tyne S. S. Co.	

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.		Manure—		Malaga, 15 10		Bordeaux, 100	
<i>Week ending Jan. 15th.</i>		Hamburg, 48 t. 16 c.		Talcabano, 1 t. 5		Brisbane, 36	
Acids—(otherwise undescribed)		Rotterdam, 20		Havana, 19		Calcutta, 30	
Natal, 5 t. 10 c.	£22	Jersey, 158 12		Ammonium Sulphate—		Callao, 30	
New York, 30 cs.	85	Oporto, 71		Ghent, 15 t. 7 c.		Catania, 55	
Jersey, 4,140 lbs.	52	Valencia, 20		Rotterdam, 55 10		Chicago, 685	
Alum Cake—		St. Lucia, 70		Hamburg, 10 17 3 q.		Constantinople, 15	
Calcutta, 175 cks.	£113	Jamaica, 5		New York, 4 17		Dunedin, 29	
Ammonium Sulphate—		Dominica, 5		Bordeaux, 70		Genoa, 80	
Hamburg, 100 t. 600 bgs.	£1,625	Demerara, 50		Hamburg, 110 13 3		Ghent, 30	
Cologne, 18 10 c.	222	Magnesia—		Valencia, 112 16 3		Hamburg, 26	
Havre, 35 3	390	Lisbon, 10 c.		Antwerp, 30		Havana, 40	
Ammonium Carbonate—		Nitric Acid—		Ammonium Carbonate—		Havre, 9	
Odessa, 2 t. 2 c.	£61	Jersey, 2 t. 6 c.		St. Johns, N. B., 9 c.		Leghorn, 14	
Acetic Acid—		Oxalic Acid—		Santander, 1 t. 2 3 q.		Malaga, 62	
Buenos Ayres, 16 c.	£13	Moscow, 5 t. 6 c.		Madeira, 4		Matanzas, 49	
Ammonium Muriate—		Odessa, 7½		Bahia, 13		Melbourne, 10	
Auckland, 2 t. 4 c.	£45	Libau, 28 cks.		New York, 13 3 1		Naples, 10	
Arsenic—		Stettin, 12		Havana, 6 3		Nantes, 35	
Amsterdam, 6 cks.	£17	Brussels, 23		Naples, 12 2		New York, 300	
Brimstone—		Genoa, 2 6		Antimony Regulus—		Oporto, 55	
Madras, 10 t. 1 c.	£59	Antwerp, 5 11		Nantes, 2 t. 1 q.		Palermo, 10	
Bisulphide of Carbon—		Potassium Chlorate—		Ammonium Muriate—		Pasages, 35	
Rotterdam, 4 t. 19 c.	£59	Oporto, 2 t.		New York, 13 t. 11 c.		Philadelphia, 200	
Copper Sulphate—		Picric Acid—		Ammonia—		Piræus, 180	
Barcelona, 10 cs.	£81	Gothenburg, 1 cs.		B. Ayres, 10 c. 2 q.		Portland, M. 310	
Salonica, 1 t. 2 c.	26	Potash—		Bleaching Powder—		Port Natal, 22	
Madras, 10	11	Toronto, 10 c.		Alexandria, 3 brls.		Rotterdam, 22	
Samsoun, 10	11	Potassium Bichromate—		Ancona, 6 7 cks.		San Francisco, 105	
Tarragona, 10 19	229	Marseilles, 7 c.		Antwerp, 112		San Vanilla, 20	
Barcelona, 12 10	251	Salammoniac—		Boston, 35		Seville, 186	
Bombay, 5	114	Varna, 1 t. 1 c.		Chicago, 389		San Sebastian, 30	
Treport, 36 cks.	214	Sulphuric Acid—		Christiania, 19		Talcabano, 25	
Chemicals (otherwise undescribed)		Buenos Ayres, 11 cs.		Genoa, 484		Tampico, 20	
Barcelona, 10 cs.	£81	Port Natal, 3 t. 6 c.		Hamburg, 25		Valparaiso, 70	
Monte Video, 10	50	Algoa Bay, 25 cs. 96 pkgs.		Havana, 37		Vera Cruz, 10	
Auckland, 23 pkgs.	175	Sulphur Flowers—		Havre, 37		Yokohama, 100	
Calcutta, 6	38	Algoa Bay, 140 kgs. 100 cks.		Lisbon, 70		Chemicals (otherwise undescribed)	
Trinidad, 4	63	Lisbon, 20 brls. 6		Nantes, 107		Beyrout, 2 t. 7 c. 2 q.	
Citric Acid—		Saltpetre—		New York, 155		Colon, 1 cs. 2 kgs.	
Seville, 6 c.	£44	Oporto, 3 t. 14 c.		Rotterdam, 14		Puerto Cabello, 5 pkgs.	
Barcelona, 1 t.	140	Wellington, 20		Venice, 5		Hio, 3 t. 19 c.	
Cadiz, ½	4	Seville, 4 cks.		Barium Sulphate—		New Orleans, 4 cks.	
Lisbon, 11	72	Adelaide, 1		Ferrol, 2 t. 1 q.		Algoa Bay, 2 q.	
Brussels, 10	74	Sheep Dip Powder—		Borax—		Copper Sulphate—	
Genoa, 20	148	Algoa Bay, 55 cs. 25 cs.		Rouen, 42 t. 17 c.		Bordeaux, 5 t. 2 q.	
Odessa, 5 kegs.	37	San Salvador, 30		Vera Cruz, 8		Rouen, 45 7 c.	
Cream Tartar—		Hobart, 5 t. 13		Matanzas, 5 2 q.		Marseilles, 7 1 1 q.	
Cape Town, 2 c.	£15	E. London, 1 10 125		Savanilla, 1		Pachuras, 20 1 2	
Sydney, 20 cks.	110	Superphosphate—		Cardenas, 2 3 3		Barcelona, 25 10 1	
Wellington, 6	36	Cherbourg, 94 t. 19 c.		Havana, 2 3 3		Beyrout, 9 2	
Algoa Bay, 65 cs.	71	Tartaric Acid—		Barium Chlorate—		Genoa, 29 9 2	
Caustic Soda—		Wellington, 5½ c.		Vigo, 5 c.		Hamburg, 5 2 2	
Cadiz, 3 t.	£25	Lisbon, 5½		Boracic Acid—		Nantes, 10 1 2	
Melbourne, 3	30	Sydney, 20 cks.		Havana, 4 c. 1 q.		Salonica, 11	
Algoa Bay, 1 14 c.	69			Brimstone—		Santander, 25 5	
Carbolic Acid—				Boston, 50 t.		Carbolic Acid—	
Yokohama, 2,000 lbs.	£41			New York, 15 c.		Rouen, 1 t. 2 c.	
Falkland, 1 t. 11 c.	28			Caustic Soda—		Shanghai, 1 12	
Colombo, 4	21			Alicante, 80 dms. 20 brls.		Havre, 20	
Disinfectants—				Amsterdam, 25		Paris, 4 7	
Madras, 2 t. 11 c.	£20			Antwerp, 100 51		Hamburg, 6 0 2 q.	
Guano—				Bahia, 10		Piræus, 1	
Morlaix, 189 t.	£1,890			Baltimore, 50		Havana, 3 3	
Hydro Carbon—				Barcelona, 225 25		Chloride of Lime—	
Brussels, 3 t. 14 c.	£66			Bari, 73		Boston, 50 t. 15 c.	
				Batoum, 150		New York, 50	
				Bombay, 15		Charcoal—	
						Hamburg, 146 t. 8 c.	
						Caustic Potash—	
						New York, 8 t. 1 c.	

Copperas —		
Rio de Janeiro, 2 t. 8 c.	£5	
Alexandria, 2 16	19	
Oporto, 2 16	6	
Piræus, 3 1	6	
Copper Precipitate —		
Halifax, 6 t.	£245	
Disinfectants —		
Bahia, 1 c 1 q.	£8	
Epsom Salts —		
Santander, 5 brls.		
Glycerine —		
Rouen, 18 t. 15 c.	£450	
New York, 23 16	720	
Monte Video, 2 cs.	7	
Rotterdam, 10	440	
Guano —		
Barcelona, 73 t. 16 c 1 q.	£719	
Iron Oxide —		
Havana, 4 c.	£9	
Magnesia —		
Rio Janeiro, 5 cs.		
Porto Alegre, 5		
Magnesium Sulphate —		
Santander, 2 t. 1 q.	£7	
Manure —		
Honolulu, 20 t.	£200	
Gr. Canary, 20	147	
Rochefort, 610 10 c.	2,005	
Oxalic Acid —		
Syracuse, 3 c.	£56	
Trieste, 2 t. 10 2 q.	60	
Messina, 3 3	13	
Pitch —		
Cette, 1,967 t.		
Coquimbo, 40 brls.		
Potassium Bichromate —		
Rouen, 5 t. 12 c. 2 q.	£200	
Rio de Janeiro, 1 cks.	15	
Calcutta, 3 c.	5	
Alexandria, 6	12	
Potassium Chlorate —		
Hamburg, 5 c.	£12	
Yokohama, 20 t.	856	
Coruna, 10	20	
Hong Kong, 1 114	85	
Kobe, 16 5	706	
New York, 1 5	73	
Portland, M., 12	15	
Gothenburg, 17 3	807	
Boston, 15	42	
Santos, 3	148	
Potassium Carbonate —		
Mozambique, 1 t. 5 c.	£24	
New York, 7 10	120	
Phosphate —		
Cape Town, 2 t.	£5	
Pearl Ashes —		
Calcutta, 14 c.	£21	
Potassium Prussiate —		
Lisbon, 1 t. 3 q.	£105	
Salt —		
Adelaide, 125 t.		
Baltimore, 180		
Barbadoes, 55		
Bibundi, 50		
Boston, 310		
Brishane, 160		
Calcutta, 12,498		
Cameroons, 36 3 c.		
Cape Coast, 7½		
Chicago, 130		
Copenhagen, 482		
Coquimbo, 220		
East London, 11		
Elobey, 218½		
Ghent, 30		
Grand Bassam, 20		
Lagos, 21		
Lavannah, 26½		
Manoh, 13 8		
Monrovia, 50		
Monte Video, 13 14		
New Orleans, 2,531 16		
Newfoundland, 5		
New York, 130		
Portland, M., 22		
Rio Nunez, 20		
Ronne, 210		
Rotterdam, 292		
Saltpetre, 6½		
San Francisco, 839		
Soda Crystals —		
Alexandria, 30 brls.		
Calcutta, 7 cks.		
Malta, 50		
New York, 386		
Philadelphia, 60		
Salonica, 44		
Trieste, 3		
Sodium Silicate —		
Alicante, 10 brls.		
Almeria, 10		

Sodium Bicarbonate —		
Almeria, 10 cks.		
Auckland, 40 kgs.		
Bombay, 200		
Calcutta, 500		
Constantinople, 20		
Dunedin, 50		
Gothenburg, 40		
New York, 100		
San Francisco, 30		
Smyrna, 40		
Wellington, 20		
Soda Ash —		
Baltimore, 709 cks. 388 trs.		
Bombay, 5 kgs.		
Boston, 878 bgs. 87 cks.		
Buenos Ayres, 50 brls.		
Calcutta, 42		
Constantinople, 20		
Lisbon, 10		
Malaga, 295		
Melbourne, 25		
Monte Video, 10		
Montreal, 123 1,558 trs.		
New York, 15		
Oporto, 5		
Para, 21 154		
Philadelphia, 170		
Portland, M., 116		
Rosario, 323		
Salonica, 400 6½		
San Francisco, 15		
Smyrna, 400		
Venice, 15		
Sodium Carbonate —		
New York, 140 brls.		
Sulphosite —		
Bombay, 11 c. 3 q.	£47	
Salomoniac —		
Samsoun, 16 c.	£26	
Vigo, 2 2 q.	5	
Alexandria, 2 t.	69	
Salonica, 1 1	39	
Trieste, 1 2	35	
Constantinople, 5 2	175	
Sodium Biorate —		
Antwerp, 7 t. 7 c. 1 q.	£221	
Hamburg, 14 19 1	450	
Portland, M., 12 14 3	394	
Buenos Ayres, 4 1	6	
Rotterdam, 12	17	
Saltcake —		
New York, 149 t. 15 c.	£326	
Sodium Sulphate —		
Valparaiso, 10 c.	£9	
Sheep Dip —		
Melbourne, 151 galls.	£26	
Cape Town, 25 cs.	50	
Sodium Nitrate —		
Valencia, 3 t. 6 c. 1 q.	£27	
Venice, 7 11 1	66	
Sulphur —		
Boston, 60 t. 5 c.	£269	
Trinidad, 5 16	35	
Superphosphate —		
Barcelona, 10 t. 3 q.	£240	
Gr. Canary, 11	33	
Hamburg, 100 1 c. 1	350	
Sodium Bichromate —		
Piræus, 1 t.	£29	
Sulphuric Acid —		
Madras, 3 t. 10 c.	£15	
Tar —		
Bahia, 6 brls.		
Calcutta, 50		
Callao, 10		
Genoa, 20 3 cks.		
Lima, 20 20 dms.		
Sierra Leone, 20		
Tin Oxide —		
Vera Cruz, 5 cks.	£56	
Tartar —		
New York, 20 t.	£1,900	
Vitriol —		
Adelaide, 5 t.	£115	
Barcelona, 14 10 c. 2 q.	90	
Passages, 4 19 3	87	
Bordeaux, 50 4 2	1,300	
Montreal, 3 5	54	
Nantes, 131 7 2	3,142	
Oporto, 1 1	17	
Calcutta, 32	670	
Constantinople, 1 15	38	
Genoa, 96 18 1	2,105	
Smyrna, 8 3	8	
Talcahuano, 1 2	25	
Trieste, 1 3	21	
Venice, 40 1 2	829	
Leghorn, 17 3 3	335	
Naples, 2 7 2	40	
Zinc Chloride —		
Bombay, 3 t. 15 c. 2 q.	£55	

TYNE.	
<i>Week ending January 22nd.</i>	
Alkali —	
Amsterdam, 24 t. 14 c.	
Savona, 62 18	
Leghorn, 29	
Rotterdam, 11	
Barcelona, 15 6	
Hamburg, 3 9	
Copenhagen, 5 11	
Anthracene —	
Rotterdam, 16 t.	
Ammonia Sulphate —	
Rotterdam, 20 t.	
Antimony —	
Rotterdam, 10 t.	
Hamburg, 3 10 c.	
Bleaching Powder —	
Copenhagen, 1 t. 9 c.	
Rotterdam, 9 19	
Hamburg, 22 5	
Antwerp, 34 9	
Lisbon, 93 5	
Libau, 20 3	
Amsterdam, 1,443	
Bergen, 5 3	
Odense, 9 5	
Barytes Carbonate —	
Rotterdam, 5 t.	
Caustic Soda —	
Copenhagen, 3 t. 12 c.	
Antwerp, 18 2	
Amsterdam, 5	
Copperas —	
Esbjerg, 6 t. 7 c.	
Copper Sulphate —	
Leghorn, 4 c.	
Flint Ground —	
Rotterdam, 10 t.	
Iron Oxide —	
Lisbon, 2	
Litharge —	
Palermo, 11	
Amsterdam, 5 t. 9	
Magnesia —	
Rotterdam, 15 c.	
Hamburg, 2	
Lisbon, 10	
Barcelona, 7 t. 13	
Demerara, 8 15	
Potassium Chlorate —	
Rotterdam, 11 c.	
Antwerp, 3 t. 5	
Pitch —	
Antwerp, 100 t.	
Soda —	
Gothenburg, 10 t. 10 c.	
Drontheim, 45 3	
Copenhagen, 25 5	
Rotterdam, 10 15	
Svendborg, 5 4	
Nakskov, 10 15	
Soda Ash —	
Lisbon, 30 t. 17 c.	
Savona, 44 10	
Leghorn, 6 9	
Antwerp, 71	
Naples, 30 2	
Sodium —	
Hamburg, 2 cs.	
Sodium Chlorate —	
Hamburg, 1 t.	
Superphosphate —	
Venice, 300 t.	
Sodium Bicarbonate —	
Amsterdam, 1 t. 1 c.	
HULL.	
<i>Week ending Jan. 21st.</i>	
Alkali —	
Bari, 4 cks.	
Fiume, 56	
Marseilles, 250 drms	
Odessa, 60	
Benzol —	
Dunkirk, 24 cks.	
Bleaching Powder —	
Danzig, 55 cks.	
Venice, 30	
Bone Size —	
Ghent, 4 cks.	
Chemicals (otherwise undescribed)	
Antwerp, 30 pks.	
Amsterdam, 1 cs. 50 cks.	
Bergen, 20	
Bremen, 75	
Bordeaux, 30	

Copenhagen.	
Christiania	
Dunkirk,	
Genoa,	
Gothenburg	
Hamburg,	
Libau,	
Naples,	
Odessa,	
Rouen,	
Rotterdam,	
Caustic So	
Libau,	
Dyestuffs (	
Hamburg,	
Rouen,	
Rotterdam,	
Reval,	
Ferro Man	
Genoa,	
Manure —	
Copenhagen	
Ghent,	
Hamburg,	
Rotterdam,	
Naphtholine	
Antwerp,	
Libau,	
Pitch —	
Antwerp,	
Dunkirk,	
Genoa,	
Slag —	
Danzig,	
Stettin,	
Tar —	
Christiansan	
Hamburg,	
Turpentine	
Malta,	
GL.	
<i>Week en</i>	
Ammonium	
Demerara,	
Bordeaux,	
Bleaching P	
Sydney, 7 t	
Bones —	
Demerara, 11	
Copper Sul	
Bordeaux, 1	
Guano —	
Demerara, 2	
Manure —	
Trinidad, 24	
Manganese	
Antwerp, 6	
Potassium	
Boston,	
Antwerp, 3	
Rotterdam, 2	
Paraffin W	
Sydney, 7	
Bordeaux, 5	
Pitch —	
Bordeaux, 2	
Sodium Bicl	
Boston, 3 t.	
G.	
<i>Week e</i>	
Benzol —	
Antwerp,	
Hamburg,	
Rotterdam,	
Chemicals (	
Antwerp,	
Hamburg,	
Coal Produ	
Calais,	
Rotterdam,	
Dyestuffs (	
Boulogne,	
Manure —	
Ghent, 4	
Hamburg, 2	
Pitch —	
Antwerp,	
Dunkirk,	
GR	
<i>Week e</i>	
Chemicals (	
Dieppe,	

PRICES CURRENT.

THURSDAY, FEBRUARY 5, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

*The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.***Acids:—**

	£	s.	d.
Acetic, 25 % and 40 %	per cwt	7/6 & 12/6	
„ Glacial	„	2 10 0	
Arsenic, S.G., 2000	„	0 12 0	
Chromic 82 %	nett per lb.	0 0 6½	
Fluoric	„	0 0 3½	
Muriatic (Tower Salts), 30° Tw.	per bottle	0 0 8	
„ (Cylinder), 30° Tw.	„	0 2 11	
Nitric 80° Tw.	per lb.	0 0 2	
Nitrous	„	0 0 1½	
Oxalic	nett	0 0 3	
Picric	„	0 1 5	
Sulphuric (fuming 50 %)	per ton	15 10 0	
„ (monohydrate)	„	5 10 0	
„ (Pyrites, 168°)	„	3 2 6	
„ („ 150°)	„	1 8 0	
„ (free from arsenic, 140/145°)	„	1 10 0	
Sulphurous (solution)	„	2 15 0	
Tannic (pure)	per lb.	0 1 0½	
Tartaric	„	0 1 3	
Arsenic, white powdered	per ton	13 0 0	
Alum (looselump)	„	4 12 6	
Alumina Sulphate (pure)	„	5 0 0	
„ (medium qualities)	„	4 10 0	
Aluminium	per lb.	0 15 0	
Ammonia, 880=28°	per lb.	0 0 3	
„ =24°	„	0 0 1½	
„ Carbonate	nett	0 0 3½	
„ Muriate	per ton	24 0 0	
„ (sal-ammoniac) 1st & 2nd	per cwt.	37/- & 35/-	
„ Nitrate	per ton	37 10 0	
„ Phosphate	per lb.	0 0 10½	
„ Sulphate (grey), London	per ton	12 0 0	
„ (grey), Hull	„	11 17 6	
Aniline Oil (pure)	per lb.	0 0 11½	
Aniline Salt	„	0 0 11	
Antimony	per ton	75 0 0	
„ (tartar emetic)	per lb.	0 1 1	
„ (golden sulphide)	„	0 0 10	
Barium Chloride	per ton	7 10 0	
„ Carbonate (native)	„	3 15 0	
„ Sulphate (native levigated)	„	45/- to 75/-	
Bleaching Powder, 35 %	„	5 2 6	
„ Liquor, 7 %	„	2 10 0	
Bisulphide of Carbon	„	12 15 0	
Chromium Acetate (crystal)	per lb.	0 0 6	
Calcium Chloride	per ton	2 0 0	
China Clay (at Runcorn) in bulk	„	16/- to 32/-	

Coal Tar Dyes:—

Alizarine (artificial) 20 %	per lb.	0 0 9
Magenta	„	0 3 9

Coal Tar Products

Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0 1 6
Benzol, 90 % nominal	per gallon	0 4 0
„ 50/90	„	0 3 3
Carbolic Acid (crystallised 35°)	per lb.	0 0 10½
„ (crude 60°)	per gallon	0 2 10
Creosote (ordinary)	„	0 0 2½
„ (filtered for Lucigen light)	„	0 0 3
Crude Naphtha 30 % @ 120° C.	„	0 1 3
Grease Oils, 22° Tw.	per ton	3 0 0
Pitch, f.o.b. Liverpool or Garston	„	1 12 0
Solvent Naphtha, 90 % at 160°	per gallon	0 1 10
Coke-oven Oils (crude)	„	0 0 2½
Copper (Chili Bars)	per ton	48 15 0
„ Sulphate	„	24 10 0
„ Oxide (copper scales)	„	52 10 0
Glycerine (crude)	„	30 0 0
„ (distilled S.G. 1250°)	„	55 0 0
Iodine	nett, per oz.	8d. to 9d.
Iron Sulphate (copperas)	per ton	1 10 0
„ Sulphide (antimony slag)	„	2 0 0
Lead (sheet) for cash	„	15 0 0
„ Litharge Flake (ex ship)	„	17 10 0
„ Acetate (white „)	„	23 10 0
„ „ (brown „)	„	19 0 0
„ Carbonate (white lead) pure	„	19 0 0
„ Nitrate	„	22 5 0

		£	s.	d.
Lime, Acetate (brown)	.. .. .	per ton	8	10 0
" " (grey)	.. .. .	per ton	14	0 0
Magnesium (ribbon and wire)	.. .. .	per oz.	0	2 3
" Chloride (ex ship)	.. .. .	per ton	2	7 6
" Carbonate	.. .. .	per cwt.	1	17 6
" Hydrate	.. .. .	.. .. .	0	10 0
" Sulphate (Epsom Salts)	.. .. .	per ton	3	0 0
Manganese, Sulphate	.. .. .	.. .. .	18	0 0
" Borate (1st and 2nd)	.. .. .	per cwt.	60/-	& 42/6
" Ore, 70 %	.. .. .	per ton	4	10 0
Methylated Spirit, 61° O.P.	.. .. .	per gallon	0	2 2
Naphtha (Wood), Solvent	.. .. .	.. .. .	0	3 9
" " Miscible, 60° O.P.	.. .. .	.. .. .	0	4 4½
Oils:—				
Cotton-seed	.. .. .	per ton	22	0 0
Linseed	.. .. .	.. .. .	22	10 0
Lubricating, Scotch, 890°—895°	.. .. .	.. .. .	7	5 0
Petroleum, Russian	.. .. .	per gallon	0	0 5½
" American	.. .. .	.. .. .	0	0 6
Potassium (metal)	.. .. .	per oz.	0	3 10
" Bichromate	.. .. .	per lb.	0	0 4
" Carbonate, 90% (ex ship)	.. .. .	per ton	18	5 0
" Chlorate	.. .. .	per lb.	0	0 4½
" Cyanide, 98%	.. .. .	.. .. .	0	2 0
" Hydrate (Caustic Potash) 80/85 %	.. .. .	per ton	23	0 0
" " (Caustic Potash) 75/80 %	.. .. .	.. .. .	21	15 0
" " (Caustic Potash) 70/75 %	.. .. .	.. .. .	20	15 0
" Nitrate (refined)	.. .. .	per cwt.	1	3 6
" Permanganate	.. .. .	.. .. .	4	5 0
" Prussiate Yellow	.. .. .	per lb.	0	0 10½
" Sulphate, 90 %	.. .. .	per ton	9	10 0
" Muriate, 80 %	.. .. .	.. .. .	7	15 0
Silver (metal)	.. .. .	per oz.	0	3 8½
" Nitrate	.. .. .	.. .. .	0	2 5½
Sodium (metal)	.. .. .	per lb.	0	4 0
" Carb. (refined Soda-ash) 48 %	.. .. .	per ton	5	10 0
" " (Caustic Soda-ash) 48 %	.. .. .	.. .. .	4	7 6
" " (Carb. Soda-ash) 48 %	.. .. .	.. .. .	4	15 0
" " (Carb. Soda-ash) 58 %	.. .. .	.. .. .	5	12 6
" " (Soda Crystals)	.. .. .	.. .. .	2	13 6
" Acetate (ex-ship)	.. .. .	.. .. .	16	0 0
" Arseniate, 45 %	.. .. .	.. .. .	10	0 0
" Chlorate	.. .. .	per lb.	0	0 6½
" Borate (Borax)	.. .. .	nett, per ton.	29	10 0
" Bichromate	.. .. .	per lb.	0	0 3
" Hydrate (77 % Caustic Soda)	.. .. .	per ton.	10	10 0
" " (74 % Caustic Soda)	.. .. .	.. .. .	10	0 0
" " (70 % Caustic Soda)	.. .. .	.. .. .	8	17 6
" " (60 % Caustic Soda, white)	.. .. .	.. .. .	7	17 6
" " (60 % Caustic Soda, cream)	.. .. .	.. .. .	7	10 0
" Bicarbonate	.. .. .	.. .. .	5	5 0
" Hyposulphite	.. .. .	.. .. .	5	2 6
" Manganate, 25%	.. .. .	.. .. .	8	10 0
" Nitrate (95 %) ex-ship Liverpool	.. .. .	per cwt.	0	8 3
" Nitrite, 98 %	.. .. .	per ton	27	10 0
" Phosphate	.. .. .	.. .. .	15	15 0
" Prussiate	.. .. .	per lb.	0	0 7½
" Silicate (glass)	.. .. .	per ton	5	7 6
" " (liquid, 100° Tw.)	.. .. .	.. .. .	3	17 6
" Stannate, 40 %	.. .. .	per cwt.	2	0 0
" Sulphate (Salt-cake)	.. .. .	per ton.	1	7 6
" " (Glauber's Salts)	.. .. .	.. .. .	1	10 0
" Sulphide	.. .. .	.. .. .	7	15 0
" Sulphite	.. .. .	.. .. .	5	5 0
Strontium Hydrate, 98 %	.. .. .	.. .. .	8	0 0
Sulphocyanide Ammonium, 95 %	.. .. .	per lb.	0	0 8½
" Barium, 95 %	.. .. .	.. .. .	0	0 5½
" Potassium	.. .. .	.. .. .	0	0 7½
Sulphur (Flowers)	.. .. .	per ton.	7	0 0
" (Roll Brimstone)	.. .. .	.. .. .	6	0 0
" Brimstone: Best Quality	.. .. .	.. .. .	4	17 6
Superphosphate of Lime (26 %)	.. .. .	.. .. .	2	10 0
Tallow	.. .. .	.. .. .	25	10 0
Tin (English Ingots)	.. .. .	.. .. .	99	0 0
" Crystals		per lb.	0	0 6½
Zinc (Spelter)		per ton.	22	10 0
" Chloride (solution, 96° Tw.			6	0 0

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As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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ON THE DETERMINATION OF MOISTURE IN WOOD AND STRAW PULP.

BY GEORGE E. DAVIS AND ALFRED R. DAVIS.

The determination of the actual quantity of paper-making material in pulp as it comes from the factory or department where it is made is attended with considerable difficulties. In the first place the task of sampling is no light one, as almost every bale varies in its percentage of moisture, and again, one portion of a bale may differ considerably from another. In the case of this fibrous material it is impossible to treat it by the ordinary methods for reducing large samples to a workable size, and the custom has obtained of cutting a piece here and there off bales, supposed to be representative of the bulk, and of estimating the moisture in each piece separately, striking an average for the final result. No doubt this method will give fairly accurate results, if the number of bales sampled be large enough in proportion to the total number; but those interested should bear in mind that to draw two or three samples from as many hundreds of bales is quite a haphazard proceeding, which can only furnish satisfactory results by the merest chance. But supposing a fairly representative sample to have been drawn; we are soon confronted with another source of discrepancy. The pieces of wet pulp are too often wrapped up in paper or some other absorbent material, and part with varying percentages of moisture according to the time that elapses before they eventually reach the laboratory and are weighed. The next process is the drying in the water or steam bath at 212° F., and from this point the custom of the trade diverges in two directions. Some firms take the weight dried at 212° F., and add on a certain definite percentage to obtain the weight of merchantable pulp at ordinary temperature; while others take the dried pulp and expose it to the atmosphere in an ordinary room for a certain length of time in order that it may re-absorb the normal amount of moisture. The weight after exposure is supposed to indicate the proportion of "air-dried pulp" in the sample.

It will be at once seen that the latter method introduces possibilities of conflict. If the dried pulp is not exposed for a uniform length of time, and under uniform conditions as regards temperature, air-currents, atmospheric moisture and the like, the results are certain to be discordant, and the difficulty of obtaining this uniformity of conditions is well known to all who have had anything to do with the subject. Where the "exposure" method is in vogue the time adopted for re-absorption is generally 24 hours. As a rule this is about sufficient, but to be on the safe side we prefer 36 hours.

It must be borne in mind that when the pulp has absorbed its full quantum of moisture, its weight will vary according to the hygrometrical conditions of the room, and, supposing draughts to be excluded, will fall with a rise of temperature, and *vice versa*.

The experience of the Manchester Technical Laboratory is not in favour of the exposure method. As the outcome of a large number of investigations upon this class of material, it is recommended to take the weight, dried, at 212°, and add a definite percentage, to obtain the weight of "air-dried" pulp. In the very great majority of cases, 10 per cent. expresses, with almost absolute accuracy, the amount to be so added, and if this figure were universally adopted, it would give much plainer sailing to all parties concerned. Even if a certain kind of pulp were known to absorb considerably more or less than this amount, it would be quite easy to regulate the price accordingly, but the necessity for this seldom arises.

To surmount the difficulty of the possibility of loss of weight between the taking of the sample and its delivery to the chemist, the following

precautions are recommended. The buyers' and sellers' representatives should superintend the weighing off, on the spot, say of 100 grammes or 1,000 grains of each agreed sample, and immediately wrap up in thin rubber tissue. If this is quickly and carefully done, and the wrapped up samples are guarded from heat or pressure, they can be delivered to the chemist without undergoing any practical loss of weight. He will of course check the figures handed him with the samples, but if the operation has been properly performed, will never find a deviation of more than two or three tenths of a per cent.

If this course were universally adopted, with the 10 per cent. addition to convert the weight at 212° into "air dried" weight, we feel certain that the disputes, now so numerous between buyer and seller, would become much less frequent, and that in the long run the sacrifice of accuracy would be comparatively nil.

THE MANCHESTER TECHNICAL LABORATORY,

32, Blackfriars Street.

Feb. 11th, 1890.

POTASSIUM CARBONATE AS A FERTILISING AGENT.

CARBONATE of potash is, according to M. Georges Ville, about to play a very important part as a potash fertiliser. Much better results are to be obtained by its use than are given by the other salts of potassium, such as the sulphate and chloride. The use of carbonate of potash in agriculture, is indeed already well known, and its high price alone has deterred agriculturists from recommending it. Too much importance is usually attached to this question of the price of the material employed, but it should be borne in mind that the effect produced by a given quantity of a product, must be considered before a fair judgment can be formed of its merits. Now, without going into the details of agricultural experiments, we may say in general, that the action of carbonate of potash is rapid, and that it produces very marked results.

Everyone has noticed how luxuriantly vegetation springs up on hillocks and slopes, the hard and dry herbage of which has been lately burned. A small plant of a dark green colour rapidly covers these formerly arid spots, and this effect is due to the potassium salts contained in the ash of the incinerated plants. The chief of these salts is carbonate of potash, and it is probably the chief agent in producing the rapid and striking alteration just described. The wandering herdsmen in Algeria, America, and even in Greece, are well aware of the improvement produced in pasturage by the incineration of the vegetation of a district, and they do not hesitate to fire vast prairies and even forests in order to ensure good pasturage for coming years.

As long as five or six years ago carbonate of potash was employed with success in the preparation of artificial compound manures. The author of this article recollects that Messrs. Guionnet and Co., of Orleans, a firm deservedly esteemed in the trade, obtained marvellous results by means of a manure made up for leguminous plants on a basis of potash, supplied by the refined carbonate of commerce.

We are not aware whether this firm continues the use of carbonate of potash in the manufacture of its manures, but, speaking generally, we may say that, owing to excessive competition and the low price to which all manures have fallen, carbonate of potash has had to be given up. Cheapness was essential, the potassium had to be supplied at the lowest possible price, and therefore almost everyone made use of the chloride and sulphate as fulfilling this condition.

Since the statements of M. Georges Ville, whose vigorous personality, eclipsed for a short period, seems about to resume the authority and popularity to which his agricultural labours entitle him, there has been a very pronounced tendency in favour of the use of carbonate of potash as a manure. We, therefore, believe that at the present moment our readers will be glad to receive any commercial information which will guide them in their purchase of this material.

SOURCE.

Plants require for their proper growth and development mineral constituents which they take from the soil, and organic constituents which they find in the atmosphere. A large proportion of this mineral matter is potassium, and certain plants in particular have a special power of appropriating its salts. If, then, the organic portion of the plant be destroyed the mineral portion remains, and this is the most fruitful source of the potash salts now produced.

POTASHES.

In former times all the potash of commerce was extracted from the ashes of wood. American and Russian *potashes*, which are now disappearing from the market, have always been obtained in this way.

Large quantities of ash were required for the production of even a small amount of potash, and entire forests had to be destroyed to supply the needs of industry.

This barbarous process had to disappear as civilisation gradually penetrated into the countries in which it was in use, and science following in its footsteps discovered other sources, both more abundant and less wasteful.

POTASHES FROM THE SUGAR BEET.

The root of the sugar beet is very rich in mineral matter, which it absorbs from the soil, and contains potash salts in quantities which depend on the condition of the ground, becoming smaller if the land has been impoverished by successive cultivations of the same root. The sugar refiners remove from the beet the greater part of its organic matter, the sugar and the pulp, whilst, on the other hand, the mineral salts accumulate in the mother liquors, along with a large amount of sugar, which they render uncrystallizable, and which cannot be removed. This mixture of sugar and mineral salts constitutes the molasses of the sugar works. The sugar of the molasses is converted into alcohol by fermentation, and the whole distilled, the alcohol being condensed, and the final residue obtained in the form of the *vinasse*, which necessarily contains all the soluble mineral constituents of the beet-root, together with a small quantity of organic matter.

BEET-ROOT SALTS.

The evaporated *vinasse* yields a black, syrupy substance, which is burnt in kilns, and thus converted into a greyish black flaky mass, resembling the ash left by coal. This is the crude beet-root potash or salt.

The composition of this material varies according to the nature of the soil in which the beet-root from which it comes has been grown, and also according to the process by which it has been worked up.

Virgin soils yield salts which sometimes contain as much as 50% of carbonate of potash. This is the case with the Austrian and German products, which are largely imported into France. These foreign salts are advantageous, as they furnish carbonate of potash at a low price, when allowance is made for the value of the sulphate and chloride in them. The following analysis shows the composition of this class of material, the sample being of German origin:—

Potassium carbonate	51.22
Sodium carbonate	10.40
Potassium sulphate	8.10
Potassium chloride	6.60
Insoluble residue	18.05
Water	5.63
	100.00

The price is calculated on the carbonate, the other salts not being reckoned. The above sample would, for example, be paid for as containing 51.22 units of carbonate, nothing being charged for the 8.10 of sulphate, and 6.60 of chloride. To express these amounts as oxide of potassium, K₂O, it must be borne in mind that

1 of carbonate=	0.6811 of potassium oxide.
1 of sulphate=	0.5407 " " "
1 of chloride=	0.6314 " " "

These numbers may be employed for converting the amounts of potassium salts in all the analysis given into oxide of potassium, and thus ascertaining the price paid in terms of this. The actual price paid for the material is from 46-47 centimes per unit of carbonate for large sales. This price is higher than that of refined carbonate of potash, because the refiner who buys those salts separates the constituents and extracts carbonate of soda, and sulphate, and chloride of potassium which he is able to sell, although he only pays for the carbonate.

The following tables contain the analysis of various samples of beet-root salts:—

	Aisne.	Belgium.	District of the Nord.	Lille.	Nord.
Potassium carbonate..	41.02	40.25	22.14	26.70	11.70
Sodium carbonate	12.41	22.75	23.10	21.10	34.10
Potassium sulphate ..	10.35	7.40	15.01	17.42	15.22
Potassium chloride....	14.64	20.00	19.90	15.25	19.40
Insoluble	14.54	7.00	14.85	15.10	13.58
Water.....	7.0	2.60	5.0	4.40	6.00
	100.00	100.00	100.00	100.00	100.00

REFINED CARBONATE OF POTASH.

These salts are produced by all distillers of molasses; they are bought by the potash refiners, all established in the district *du Nord*, whose object is to separate from them their various constituents and sell them separately. We shall not enter upon a description of this process which has previously been described in our columns, but will simply

state that by the process the refiner obtains refined potashes, carbonate of soda, sulphate of potash, and chloride of potash. The purity of the refined potashes varies considerably, but, speaking generally, does not transcend the limits of 70 and 93%. The usual products contain 75.80, 78.82, 80.85, 88.92 per cent.

It takes the form of pure white, small, round granules, mixed with other larger pieces, varying between the size of a hazel nut and a walnut. If the calcination has been well conducted, all the pieces are of a dull, pure white, even to the centre, rounded like pebbles, very hard, and sometimes tinted faintly blue. The actual price of refined potash is 43 centimes per unit for large sales, 70.85 % quality; richer qualities being priced at 45.46 centimes per unit.

The following table gives analyses of various types of refined potashes:—

	70/75	75/80	78/82	80/85	90
Carbonate of potassium....	72.57	77.31	80.94	84.21	91.94
Carbonate of sodium.....	15.36	14.34	11.50	8.55	2.25
Chloride of potassium....	5.51	3.50	3.19	3.02	2.10
Sulphate of potassium....	3.46	2.90	2.50	2.20	2.40
Insoluble residue.....	0.43	0.40	0.42	0.43	0.73
Water.....	0.70	0.42	0.43	0.50	0.58
Phosphates.....	1.97	1.13	1.02	1.09	—
	100.00	100.00	100.00	100.00	100.00

MANUFACTURED REFINED POTASH.

We have said that the refining of the beet salts consists in separating out the sulphate and chloride of potassium; the salts can themselves be converted into carbonate of potash by the process employed in the manufacture of soda ash from salt. The Leblanc process, in short, may be applied to the potassium salts obtained from Stassfurt.

This process did not at first give such satisfactory results with potash as with soda salts, but it has now been perfected, and gives a product which may be used in all the industries which require pure carbonate. The product obtained contains 94 %.

The material now turned out is a magnificent product consisting of very white small grains or fine powder, which contains 88.94 %. Its actual price is 46 centimes per unit of potassium carbonate.

Analysis of a sample of manufactured carbonate of potassium:—

Potassium carbonate.....	91.25
Sodium carbonate.....	2.22
Potassium sulphate.....	2.40
Potassium chloride.....	2.21
Water.....	1.00
Insoluble and not determined..	0.92
	100.00

POTASH DERIVED FROM SUINT.

Sheep's wool is impregnated with a fatty substance, which amounts to 15.20% of the total weight, and is known as suint. This substance is excreted from the sheep's skins by the aid of small glands, situated at the base of the hairs. It increases in amount with the fineness of the wool, amounting to as much as 35% of the weight in fine fleeces, whereas it may not be more than 8.10% in coarser wool.

The suint consists of the potassium salt of an organic acid, together with fatty matter, either free or combined with earthy basis, such as lime or alumina. The potassium compounds are very soluble, the simple process of washing the wool in water sufficing to dissolve them. One hundred kilos. of wool contain from 4.8% of potassium salts, according to the amount of suint.

The wash waters are evaporated, the residue calcined, and then sent into the market as suint potash. It is produced in all the great wool districts, Roubaix, Tourcoing, Dorignies (Nord) Reims, Verviers, etc.

It is particularly suitable for agricultural use since it contains very little sodium.

The actual price is 0.40—0.42 francs per unit of carbonate of potassium.

The following analysis show the usual composition of this material:

	1	2	3	4	Steeping Water.
Carbonate of potassium..	79.25	76.28	82.05	70.25	48.26
„ soda.....	2.00	3.02	2.07	3.29	4.01
Chloride of potassium..	4.85	4.81	3.85	6.40	6.40
Sulphate „	3.90	4.24	3.10	5.82	5.90
Silicate „	—	1.80	—	1.22	4.80
Insoluble.....	5.22	5.81	4.01	7.42	27.53
Sulphides and Sulphites	—	—	1.25	—	—
Water.....	4.78	3.50	3.67	5.60	3.10
	100.00	100.00	100.00	100.00	100.00

PRODUCTION.

The following table gives the actual production of potassium in France:—

Beet salts, going from the distillers to the	
Worked up by the distillers themselves ..	
Imported from Germany, Russia, and Belg	
Suint potash	
Refined potash.....	
Manufactured potash	

The refining industry extracts from the chloride, 10% of sulphate, and 25% of soda.

The production of beet salts during 1888 being dear, the molasses were all utilised for

The approaching spring should give much because sugar being very low, much more conversion into sugar at the present prices.

The salts produced by the sugar makers composition:—

Carbonate of potassium.....	
Carbonate of sodium	
Sulphate of potassium	
Chloride of potassium	
Residue	

THE USE OF INDUSTRIAL MANURES.

WOOLLEN WASTE.

THE waste from the woollen industries is generally and sometimes in potash. Crude wool consists of two parts:—1, the true wool, containing 2, the suint, which contains up to 33% of potassium. It is understood that the first of these leaves residues as fertilizers.

All the waste coming from wool, comprising combing, and sifting the sweepings of the rooms, etc., contains nitrogen in the same proportion as the admixture of earthy and inert matter is often percentage of nitrogen considerably, and this is the greatest extent with material which is fine residues consist chiefly of the fine pile their residue amount to 13%. Those which come into the market contain 3.5% of nitrogen, together with 0.3 and 0.18% of potassium. They sell at about the same price as other fertilizers. Crude extracts should never be entered upon without a knowledge of the value of the goods by analysis.

Dust from sifting is usually richer and contains more potassium by separating the finest parts from the pile by the former only contains 2% of nitrogen, while the latter contain as much as 5 or 6%. These residues are directly, since their decomposition in the soil is therefore necessary to submit them to a preparation.

WOOL DUST.

The treatment to which the wool is subjected produces a very fine powder, called wool dust or suint dust, which contains:—

	Petermann.	A
Nitrogen	3.00	3.00
Phosphoric Acid ..	0.85	0.85
Potash	0.87	0.87

RESIDUES FROM WASHING.

During the washing of crude wool a deposit is found. A sample of this, containing half its weight of water, found to contain:—

Organic Nitrogen	
Phosphoric Acid	
Potash	

The chemical treatment of the wool also yields small quantities of phosphoric acid, and carbonate of potash. These solutions may be employed directly, but as they are acid they must first be neutralized, done most economically by means of mineral phosphoric acid.

DIRECT APPLICATION AS FERTILIZER.

In utilising these various products for agricultural purposes, it is necessary to submit them to previous treatment, either by

compose in heaps, watering them periodically, or mixing them with lime, or making them up with other materials into composts. In this way their fertilising action is rendered more efficacious, and their decomposition, which would otherwise only proceed very slowly, is considerably accelerated.

INDUSTRIAL TREATMENT.

The wool waste is in some cases boiled for several hours with alkalis, such as carbonate of soda or lime, which break up and dissolve the fabrics; or it may be dissolved in sulphuric or hydrochloric acid. Another process often employed is that of dry distillation. Recently a process has been introduced by which the waste is treated with steam at 150°, and under a pressure of 5.6 atmospheres. After about 7.8 hours of this treatment a solution is obtained, which, on evaporation, yields a brittle brown substance, which has a cinchoidal fracture, and has been called *azolins*. In all of these processes a certain amount of ammonia is formed which ought of course to be collected.

M. Petermann gives the following analytical details:—

	Organic Nitrogen.	Nitrogen as Ammonia.
Waste heated in closed vessels...	4.18	1.09
Rags treated with steam	7.5—8.5	0.75—1.00
Clippings, with steam	8.52	0.74

—*L'Engrais*.

Our Book Shelf.

THE PAPER TRADE DIRECTORY for 1890. Published at the offices of "Paper-making," 66, Ludgate Hill.

This exceedingly-interesting annual directory of the Paper Trade contains a concise account of all the paper mills of the United Kingdom. The English mills are classified as hand-made mills, machine mills, and board mills; and the information given concerning each of them is of such a character as to prove of extreme utility. The chapter on "the chief centres and paper-making districts" will be found useful for those fresh on the road; and one of the first lessons in travelling is aptly put on p. 66 as follows:—"Always enquire at the station the nearest way to the mill, and valuable information can always be obtained, particularly if a small silver coin change ownership."

A. DICTIONARY OF APPLIED CHEMISTRY. Edited by T. E. Thorpe, B. Sc., Ph. D., F.R.S. Vol. I., price 42s. London: Longmans, Green & Co., 1890.

It must always be a difficult task to produce a treatise on technological chemistry; and even to edit the writings of more practical men is a work that can only be accomplished by a well-trained mind. There are many drawbacks to contend against, but no doubt they are minimised by the system of employing simultaneous specialists; and such method has, we are pleased to say, been adopted in the volume before us. By this means descriptions of processes are brought down to as recent a date as it is well-nigh possible to achieve; and, as now-a-days, technical knowledge is too vast a subject for one man to know completely, it stands to reason that when the various processes are explained by men who have had the technical supervision of them, their description is to that of the mere theorist as the substance to the shadow. One omission, however, we cannot well pass over. In the list of abbreviated titles of books and journals, we do not find the *C. T. J.* It may be that the Editor does not intend to draw any information from our columns, in which case of course the introduction of our initial letters would be superfluous.

In this volume, Mr. A. H. Allen writes the article on disinfectants, of which subject he has had considerable experience; Mr. C. F. Cross, cellulose; Mr. L. Field, candles; Mr. R. J. Friswell, aniline products; Professor J. J. Hummel, dyeing; Professor G. Lunge, ammonia, bromine, and chlorine; Professor R. Meldola, azo-colouring matters; Professor W. C. Roberts Austin, alloys and assaying; Mr. C. O'Sullivan, carbohydrates; Dr. Otto N. Witt, azines. We do not know of any other specialists more capable of treating these subjects than the names we have selected, and the editor is to be congratulated on securing their valuable services.

With regard to the matter itself, there is the fact of a difference in quality of the various articles; the palm must be given to the true technologist. We need only cite the articles on copper and chlorine to prove our point. The first is very commonplace, and does not contain anything not to be found elsewhere, while that on chlorine by Dr. Lunge is a specimen of what technical articles should be. We are much pleased with the work, mainly on account of its freedom from mere copying so often found in treatises of this kind, where the traditions of yesterday, with much fiction, are served up anew as an intellectual food for to-day. We would advise the article on alums to be re-written for the next edition.

The chapter on azo-colouring matters is of a very valuable kind, and the extent of this industry may be seen by the 12 pages of patents referring to them, all of which have been taken out during the last 12 years. The benzene article will furnish much information to our English benzol refiners, who have not usually the most scientific appliances; an illustration is given of Ader's latest rectifying apparatus. The article on the manufacture of Portland cement does not come up to our ideal of technical information, neither does the article on chromium. To the writer of the matter on colorimeters we commend the form in *C. N.*, p. 299, vol xxvii.

A very valuable table is to be found on page 586 *et seq.*—the detection of colours on dyed fabrics. This table occupies twelve pages, and will be of the utmost service in all dye works laboratories.

Turning to matter of a physical rather than of a technological character, there are several articles deserving of special attention, the balance, by Professor Dittmar, and on distillation by Professor Sydney Young, which latter should form the basis for instruction in this very important department of laboratory practice. Unfortunately too many students pass through their laboratory career without having been made thoroughly acquainted with such processes as these, and when they go forth into the world, are thrown upon their own resources, and find they have much to learn. The dictionary of applied chemistry will furnish us with some very interesting reading, and we have no hesitation in pronouncing it the best of its kind in the English language, so far as it has gone yet; it will form a handy book of reference for years to come.

THE GALLOWAY BOILER. Published by Galloways, Limited, Manchester.

How each generation managed to acquit itself so well with the appliances at its disposal, is always a matter of wonder to the generation that succeeds it. With feelings of this kind we have turned over the pages of the small publication with which we have just been favoured by Messrs. Galloways, Ltd. Not only for the individual interested directly in steam-boilers, but for everybody else into whose hands the book may fall, an exceedingly interesting half-hour is provided. A brief sketch of the history of the development of the modern steam boiler introduces a very complete and detailed description of the process of manufacture, and the machinery employed in the various operations. The text is supplemented by a series of well designed and well executed cuts.

Most people standing in front of a Galloway boiler of the latest type are conscious that the huge aggregation of tubes and plates before them, represents the expenditure of no little force and skill, but few realise the fact in anything like its entirety. Every detail in the construction, is of sufficient importance to occupy the inventive genius of the machine maker, from bending the plates, to fastening the rivets or welding the furnaces and flues. We note that Messrs. Galloways have turned out 338 boilers in one year, weighing in the aggregate 3,770 tons, and as another proof of the magnitude of their operations, it may be mentioned that their consumption of rivets amounts to about 250 tons per annum. Exclusive of the Knott Mill Works, which is now used solely for engine construction, the boiler-works proper at Ardwick, occupies eight acres, and finds employment for 600 men.

RUNCORN SOAP AND ALKALI COMPANY.

THE annual meeting of the shareholders of the Runcorn Soap and Alkali Company was held at the Law Association Rooms, Liverpool, on Monday last; Mr. A. P. Fletcher, the chairman, presiding. The report of the directors for the past year expressed regret at the result of the working, which, however, had been carried on under exceptional circumstances. The net profit for the year had been £963. 16s. 9d., and the balance from last year £5,864. 16s. 7d. being added to this made £6,823. 13s. 4d. as the present available surplus. It was proposed not to pay a dividend, but to carry forward the whole sum. The past year had been a very disappointing one for the alkali trade, for, with the exception of bleaching powder, nearly every article manufactured had failed to realise cost.—The report was adopted, Messrs. Chas. Langton and E. W. Rayner were re-elected directors of the company, and a motion for the payment of £750. as directors' fees (being £250. less than last year) was carried *nem. con.*

BURMAN PETROLEUM.—The report is that Sir Lepel Griffin and others, having constituted themselves a Syndicate, have received a concession of four square miles of oil-producing land in Upper Burmah. Burmah, we have not to add, has long been known for its mineral oil. It indeed furnished the chief supply before the development of the Trans-Caucasian and U.S. oil-fields. Burman Petroleum is said to resemble Canadian as being especially rich in solid paraffins.

Legal.

HIGH COURT OF JUSTICE.—CHANCERY
DIVISION.—Feb. 4th.

(BEFORE MR. JUSTICE NORTH.)

BARRETT AND ELSERS (LIMITED) V. DAY—DAY V. FOSTER.

HIS Lordship delivered an elaborate judgment recently upon two summonses in these actions. Some important questions arose as to the operation of section 32 of the Patents Act of 1883, which provides that "when any person claiming to be the patentee of an invention by circulars, advertisements, or otherwise, threatens any other person with any legal proceedings or liabilities in respect of any alleged manufacture, use, sale, or purchase of the invention, any person or persons aggrieved thereby may bring an action against him, and may obtain an injunction against the continuance of such threats, and may recover such damage (if any) as may have been sustained thereby if the alleged manufacture, use, sale, or purchase, to which the threats related, was not in fact an infringement of any legal rights of the person making such threats. Provided that this section shall not apply if the person making such threats, with due diligence, commences and prosecutes an action for infringement of his patent."

Mr. Cozens-Hardy, Q.C., and Chadwyck Healey were for Barrett and Elers and for Foster; Mr. Moulton, Q.C., and Mr. Thomas Terrell were for Day.

Mr. Justice North concluded his elaborate judgment as follows:—In my opinion, the prosecution of an action is vexatious when it is clear that no relief can be granted at the trial. The only relief sought in this case by Barrett and Elers is an injunction to restrain Day from threatening them, or their licensees or assigns, with reference to alleged infringements of Barrett and Varley's patent, and damages and costs. As regards the threat to bring the action of "Day v. Foster," no injunction to restrain such threat could be granted at the trial, nor could have been at any time since the writ in "Barrett and Elers v. Day," as no such threat was any longer possible after the action had been brought, and no damages could be recovered in respect of a threat which did not give rise to any cause of action. And, as regards any other threats, none are proved or alleged, nor is there anything from which any intention on the part of Day to make such threats could be inferred, and no injunction can be granted to restrain a defendant from doing an act which it is not proved or even alleged that he ever intended or threatened to do (see "Stannard v. Vestry of St. Giles," 20 Ch. D., 190; "Proctor v. Bayley," 42 Ch. D., 390): nor could there, of course, be any damages for an act which was never committed. What Barrett and Elers avowedly desire to do is to try whether Day's patent is valid or not. But no such question can arise in their action, under the circumstances I have mentioned, as there is no issue to which it can be relevant, although, no doubt, according to "Challender v. Royle" and "Kurtz v. Spence" (36 Ch. D., 770), such question might have arisen if any threatening or intention to threaten on Day's part was alleged and proved, and there was an issue to be decided at the trial whether such threatening was justifiable or not. Under these circumstances I am of opinion that there is not, and never was, any cause of action in "Barrett and Elers v. Day" in respect of which relief can be granted at the trial, and that, this being so, the action is vexatious, and the proceedings therein should be stayed, and I accordingly direct such stay, and that the defendant Day's costs should be paid by the plaintiffs. In deciding that it is vexatious I do not mean to impute to the plaintiffs therein that it was commenced for the purpose of annoyance. I have no doubt it was considered a legitimate move in the war game of litigation between the parties. But this is no reason why the defendant should be harassed by the continuance of proceedings which, in my opinion, cannot result in a decision in the plaintiffs' favour. Foster's summons in "Day v. Foster" seeks to have all proceedings in that action stayed until after the trial of the other action. I see no reason whatever for this. No question as to threats or as to the validity of Day's patent can be tried in the action against Foster, but that is the proper action in which to try whether the articles which Foster has made, are, or are not, infringements of Day's patent. The questions in the two actions are entirely different, Foster's affidavit in support of his summons says that if what he asks is granted he is willing to be bound by the decision in Barrett and Elers' action, so far as the issues as to validity and infringement are concerned. Inadvertently he lets out that what he is really seeking is to impugn the validity of Day's patent—a thing which he has expressly contracted for valuable consideration that he will not do. I consider such an attempt not creditable to him and vexatious in every sense, and I dismiss his summons with costs.

FERTILISERS FOR PLANTS.

FOR no one manure can the same amount of infallibility be asserted, for none can so universal an application be proclaimed as for So-and-So's cosmopolitan pills. Every gardener, too, knows, what the public appears not to realise in the case of physic, that a manure which may be excellent at one time or for one plant, may be useless or even injurious at another. Gardeners, too, are often made to pay an exorbitant price for an article otherwise good. This was made apparent some years since, when we published a series of analyses of popular manures and insecticides. All of these proved good in their way, but the prices charged were in most instances extremely high. Any village chemist capable of compounding a prescription for a cow can mix a preparation suitable for plants under different circumstances, but as an aid to gardeners and others, we cite the following from a recent number of the *Jardin*. They or something equivalent have often been cited before, but the proportions of the several ingredients have not always been stated in so convenient a fashion. Dr. Jeannel's prescription, containing, as it does, notable proportions of nitrogen, phosphoric acid, and potash, is of general utility, though, indeed, the amount of potash in the soil is rarely deficient:—

Nitrate of ammonia	380 parts.
Biphosphate of ammonia	300 "
Nitrate of potash.....	260 "
Biphosphate of lime	50 "
Sulphate of iron	10 "

1,000

For flowering plants in pots the following mixture is recommended:—

Superphosphate of lime	4 parts.
Sulphate of lime	2 "
Nitrate of soda	1/2 "
Sulphate of ammonia	1/2 "
Chloride of potassium	1/2 "

For foliage plants in beds:—

Superphosphate of lime	4 parts.
Nitrate of soda	3 "
Chlorine of potassium	1 "
Sulphate of lime	1 "

300 grammes (say 1/2 lb.) to be used per square yard at the time of planting. By citing it in this fashion the quantity to be made may be large or small. M. le Marquis de Paris recommends for foliage plants in pots:—

Nitrate of soda	1 part.
Sulphate of ammonia	1 "
Superphosphate of lime	2 "
Sulphate of lime	1 "
Chloride of potassium	1/2 "

For flowering plants in beds:—

Nitrate of soda	2 parts.
Superphosphate of lime	10 "
Chloride of potassium	2 "
Sulphate of lime	4 "

Of these mixtures a teaspoonful should be used in a gallon of water once a week.—*Gardeners' Chronicle*.

ELECTRICAL.

1. How strong a current is used to send a message over an Atlantic cable? A. Thirty cells of battery only, equal to thirty volts.
2. What is the longest distance over which conversation by telephone is daily maintained? A. About 750 miles, from Portland, Maine, to Buffalo, New York.
3. What is the fastest time made by an electric railway? A. A mile a minute, by a small experimental car. Twenty miles an hour on street railway system.
4. How many miles of submarine cable are there in operation? A. Over 100,000 miles, or enough to girdle the earth four times.
5. What is the maximum power generated by an electric motor? A. Seventy-five horse power. Experiments indicate that 100 horse power will soon be reached.
6. How is a break in a submarine cable located? A. By measuring the electricity needed to charge the remaining unbroken part.
7. How many miles of telegraph wire are in operation in the United States? A. Over a million, or enough to encircle the globe forty times.
8. How many messages can be transmitted over a wire at one time? A. Four, by the quadruplex system, in daily use.

- . How is telegraphing from a moving train accomplished? A. Through a circuit from the car roof, inducing a current in the wire on rails along the track.
- Q. What are the most widely separated points between which it is possible to send a telegram? A. British Columbia and New Zealand, America and Europe.
1. How many miles of telephone wire are in operation in the United States? A. More than 170,000, over which 1,055,000 messages are sent daily.
2. What is the greatest candle power of arc light used in a lighthouse? A. Two millions, in the lighthouse at Housholm, Denmark.
3. How many persons in the United States are engaged in business depending solely on electricity? A. Estimated 250,000.
4. How long does it take to transport a message from San Francisco to Hong Kong? A. About fifteen minutes, *via* New York, Canso, Penzance, Aden, Bombay, Madras, Penang, and Singapore.
5. What is the fastest time made by an operator sending messages the Morse system? A. About forty-two words a minute.
6. How many telephones are in use in the United States? A. Out 300,000.
7. What war vessel has the most complete electrical plant? A. United States man-of-war, Chicago.
8. What is the average cost per mile of a transatlantic submarine cable? A. About 1,000 dols.
9. How many miles of electric railway are there in operation in the United States? A. About 400 miles, and much more under construction.
10. What strength of current is dangerous to human life? A. One hundred volts, but depending largely on physical conditions.—*see of Steel.*

PRIZE COMPETITION.

LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, and at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested. At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of a few days, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner. We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 15th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

COCOANUT BUTTER.—The *Times'* Calcutta correspondent tells of a new trade that has arisen in India and attained extraordinary dimensions. "It is the trade in cocoanut butter, which is being chiefly manufactured at Mannheim, in Germany. It is news that the commodity is meeting with such a ready market in India. But, some time ago, we were careful to explain the character of this new industry. As regards its constituents and specific gravity, cocoanut oil is likelier than any other natural fat. The insoluble fatty acids are the same in each; and they have nearly the same percentage of total acids. These acids are not present in the same proportion—this and the different melting-points mark the difference.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- J.R.C.—We do not think the users of the apparatus would show it you in action especially as you are in the trade.
- CEARA.—Write us an account, it will be interesting to some of our readers.
- JOHN BULL.—We are tired of railway rates. The traders would have done better by following our lead last April.
- COPPER.—We are not able to answer your query. 1. Consult some experienced analytical chemist.
- JOHN.—You are sadly mistaken; there is plenty of vitriol now in the market made from coal-brasses.
- P.P.—Give us a call the next time you are in Manchester.
- R.P.L.—There are many reasons why we should *not* do as you suggest.
- H.H.—The matter is a trade secret, and we do not know where you could get the information.
- C.—We endeavour to be as correct as possible, but errors will sometimes creep in, in spite of continual watchfulness.
- SALTS.—Unless you wish to gain your experience at a high cost, we could not advise you to build your plant from text books.
- CHLORINE.—Yes, we believe that bleach is now being made by the Deacon process, with less than a ton of salt. It was Hasenclever who first showed us how to do it on a practical scale. 2. Five plants we think.
- AQUA.—See our replies on same subject to correspondents in last week's issue.
- E.G.M.—Perfectly safe.
- R.T.—We cannot reply to such queries in this column. It is a matter of which much may be said on both sides.

Market Reports.

THE LIVERPOOL MINERAL MARKET.

Our market has continued further to advance, and prices all round are in favour of sellers. Manganese: There have been no arrivals this week, whilst stocks have been heavily drawn upon, and a considerable advance in prices has been paid for spot and forward delivery. Magnesite: Raw lump quiet, raw ground, £6. 10s., and calcined ground, £10. to £11. Bauxite (Irish Hill brand): The supply can scarcely keep pace with the demand, and prices are strong. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have been considerably larger, but prices are unaltered, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d.; good medium, 30s.; medium 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone steady; ground at £10., and specially selected lump, finest quality, £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 16s. to 20s. Purple ore unchanged. Spanish manganese ore commands ready sale at full prices. Emery-stone: Best brands continued to be enquired for, bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda and tungsten metal more inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High percentage inquired for at fair prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: The miners' strike has terminated, but prices are still firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native) £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand sought after, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in fair demand at 22s. to 25s. Plumbago: More offering; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese selling easily at advanced figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

MISCELLANEOUS CHEMICAL MARKET.

There has been a slight relapse during the week in the value of caustic soda. 70%, £8. 12s. 6d. to £8. 15s. per ton on the spot. 60%, £7. 17s. 6d. per ton, and cream 60%, £7. 12s. 6d., all f.o.b. Soda ash keeps steady in price, at 1½ to 1¾ per deg., and there is a fair amount of inquiry. Soda crystals keep up in value, and there is at present a brisk demand. Chlorate of potash quiet but firm, at 6¼d. per lb. Sulphur is suffering from keen competition by certain sellers, determined upon forcing their product upon the market, and notwithstanding a general good demand, there is a decline in values all round. Muriatic acid and vitriol still continue to find ready outlet at full prices. Sulphate of copper firm, at £24. 10s. for early deliveries, but easier for forward. Brown acetate of lime slow of sale, and rather lower in price, at £8. 5s. to £8. 7s. 6d. at usual centres of consumption. Grey, firm, £13. 15s. to £14. Acetate of soda in fair demand at current low rates. Acetic acids are quiet. Acetates of lead meet with little enquiry, but prices keep firm. Nitrate of lead selling slowly, at £22. to £22. 10s. Chloride of magnesium plentiful on the spot, price unaltered. White powdered arsenic shows a tendency to rise in value, and sells on the spot at £13. net at usual points of delivery. Tin crystals are slightly lower in sympathy with the metal. Yellow prussiate of potash still scarce, at 10d. to 10¼d. per lb. Oxalic acid is less plentiful, and not so easy to obtain at the low figures recently ruling. Potash caustic and carbonate can be obtained on slightly easier terms for early delivery, and the demand is light. Iodine still unsettled.

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	56 1½	....	51 10½
Tin	£94 0 0	....	£91 0 0
Copper	48 17 6	....	46 17 6
Spelter	24 2 6	....	21 10 0
Lead	13 0 0	....	12 12 6
Silver	44 ½	....	44d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	16 ½ 16 ½	....	14 ½ 15
Mason & Barry	6 ½ 6 ½	....	6 ½ 6 ½
Tharsis	4 ½ 4 ½	....	4 ½ 4 ½
Cape Copper Co. ..	3 ½ 3 ½	....	3 ½ 3 ½
Namaqua	2 ½ 2 ½	....	2 ½ 2 ½
Copiapu	2 ½ 2 ½	....	2 ½ 2 ½
Panulcillo	1 ½ 1 ½	....	1 ½ 1 ½
Libiola	3 ½ 3 ½	....	3 ½ 3 ½
New Quebrada	½ ½	....	½ ½
Tocopilla	1/9 2/3	....	1/6 2/-
Argentella	6d. 1/-	....	6d. 1/-

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

The market is decidedly stronger for most of the ordinary chemicals, and where changes occur these are mostly to the rise. Caustic soda has been largely dealt in, and the demand has resulted in very stiff prices for the moment, as compared with anything ruling in this section for a long time back. Bleaching powder has been much steadier, and last quotations for the local supply have been quite fully maintained. Soda crystals are very firm, as are also soda ash and refined alkali. Nitrate of soda at the same time is slightly firmer, and fetching improved conditions. Sulphate of ammonia has bettered itself to the extent of quite 2s. 6d. to 5s., and to-day for spot Leith £11. 17s. 6d. has been paid. At the same time, speculative dealers here are a good deal at sea as regards the precise character of the influences at work, and they make no certainty as to the course of the market in the immediate future. Forward section is still pretty much a blank. In paraffins there has been an improvement in the call for oils, both burning and lubricating, the former having been helped considerably by the dense fogs locally prevailing. The 885° gravity of the latter is dearer by some shillings. Chief prices current are:—Soda crystals, 50s. net Tyne; alum in lump £4. 17s. 6d., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 5% Tyne; caustic soda, white, 76°, £11., 70/72°, £8. 17s. 6d., 60/62°, £8., and 60/62° cream, £7. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5., and 1 cwt. casks, £5. 5s. net Tyne; refined alkali 48/52°, 1½d., less 2½% Tyne; saltcake, 25s. 6d. to 26s. 6d.; bleaching powder, £5. 15s. to £6. less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d. to 4¾d., less 5% any port; nitrate of soda 8s. 4½d. to 8s. 6d.; sulphate of ammonia, £11. 17s. 6d. f.o.b. Leith; salammniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of

copper, £25. less 5% Liverpool; paraffin sci 2¾d.; paraffin wax, 120, semi-refined, (naphtha), 9d.; paraffin oil (burning), 6¾d. ditto (lubricating), 865°, £5. 10s. to £6., 890/895°, £7. 10s. to £8. Week's imports were 40,404 bags.

THE LIVERPOOL COLOUR

COLOURS quiet; prices unaltered. Ochres at £10., £12., £14., and £16.; Derbyshire, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; Umber: Turkish, cargoes to arrive, 40s. to 5 to 55s. White lead, £21. 10s. to £22. Red lead of zinc: V.M. No. 1, £25.; V.M. No. 2, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. white, 60s.; good, 40s. to 50s. Rouge: Best, £2 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide £10. to £15. Paris white, 60s. Emerald green, shire red 60s. Vermillionette, 5d. to 7d. per lb.

TAR AND AMMONIA PRO

Benzoles are a trifle weaker, and 3s 10d, 50/90's are about to-day's values. Solvent naphth and 1s. 9d. f.o.b. is being asked for prompt delivery moving off freely, while Anthracene is, on the weaker. The pitch market is very weak, and it see lower prices; 32s. 6d. is the price in London, 3 generally, and 31s. 6d. Garston. At these prices could be done, though perhaps in some cases with

Speculators have all through the week been doing depress the sulphate of ammonia market, but it has principally through the firm position taken up by very little business has been done below £11. 17s. 6d. there are buyers at this figure to-day both at F Some Leith business is reported at £11. 16s. 3d., but be repeated. London values are £11. 17s. 6d., £11. 16s. 3d. to £11. 17s. 6d.

REPORT OF MANURE MAT

There has been less business doing during the past both nitrogenous and phosphatic material are some buyers. Supplies seem to have overtaken the demand usual result.

We have no alteration to notice in the quotation River phosphate rock, shippers refusing to entertain unit for cargoes, cost, freight, and insurance to U.K. land rock might perhaps be had at ¼d. to ½d. per tons for Somme and Belgian remain as quoted a don't hear of any important transactions having to small orders are being booked all the time. Quotation rock remain nominal, there being nothing doing in the

Supplies of bones have begun to come forward from Spain, and Valparaiso, and values on spot have given Common grinders would not now fetch more than £1 to £5. 5s. for good clean hard bones. There is no River Plate bones, the cargoes offering being end of and buyers not liking to run any risk about the arrival for to meet their Spring requirements. Five pound ten U.K. port, is nearest value for large cargoes; £5. 15s. a There are now sellers of crushed East Indian bones: ex-quay Liverpool, February-March steamer ship nearer at hand would probably fetch 1s. 3d. to 1s. 6d. East Indian bone meal is freely offered at £5. 7s. 6d. Liverpool, Hull, or Glasgow, and it seems likely that presently be taken, there being pressing sellers at spot, ex store, higher prices are demanded, but the actual business passing.

The stronger feeling in nitrate of soda last week 18s. 4½d. is again spot price. The nearest value 8s. 4½d., and a little more might perhaps be obtained shipments, but the negotiations for a reduction of hang fire, and buyers having again lost confidence, do on at all.

The value of 26% superphosphate remains as last per ton in bulk, f.o.r. at works.

We do not hear of any fresh business in dried parcels of River Plate have arrived per steamers, an auction as soon as landed. Meantime, buyers are in anticipation of lower prices than have been recently

Gazette Notices.

PARTNERSHIPS DISSOLVED

HUNTER, WATERS, AND CO., Gracechurch-street, London, chemical brokers and agents.

First Meetings and Public Examinations.

F. ASKE, Carnaby-street, Soho, London, oil and colourman, first meeting, February 18th, Bankruptcy-buildings, Portugal-street, Lincoln's Inn Fields. February 27th, 94, Lincoln's Inn Fields.

Adjudications.

HENRY OSWALD JAMES, Wolverhampton, mineral agent.
H. V. MURRAY, Colorado Mining Syndicate, Lombard-street, London,

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Lubricators. W. B. Sayers. 973. January 20.
Artificially Maturing Spirits. H. Grimshaw. 980. January 20.
Recovery of Tannin from Waste Leather. H. Grimshaw. 981. Jan. 20.
Soap and Soap Powders. H. Grimshaw. 983. January 20.
Generation of Carbon Dioxide. H. Grimshaw. 984. January 20.
An Improved White Pigment. H. Grimshaw. 985. January 20.
Manufacture of Artificial Fuel. W. H. Nevill. 1,001. January 20.
Lubricators.—(Complete Specification). A. J. Boulton. 1,003. January 20.
Pumps for Viscous, Pulpy, or Semi-Liquid Substances. W. P. Thompson. 1,006. January 20.
Manufacture of Soda and Potash. F. Ellershausen. 1,015. January 20.
F. Ellershausen. 1,016.
The Manufacture of Disinfectants. W. Dammann. 1,017. January 20.
Manufacture of Water Gas. T. Walrond-Smith. 1,022. January 20.
Electrical Apparatus.—(Complete Specification). W. P. Thompson. 1,028. January 21.
Soaps. E. Ireland. 1,047. January 21.
Dynamoes and Electric Motors.—(Complete Specification). C. Bollé. 1,050. January 21.
Recovery of Zinc from Galvanised Iron and Steel. H. Grimshaw. 1,055. January 21.
The Production of Azo Colours upon Cotton. S. Knowles and J. Knowles. 1,067. January 21.
Dynamoes and Electric Motors. G. B. Lückhoff and E. H. Hungerbühler. 1,068. January 21.
Decolourising and Solidifying Drying Oils. A. F. St. George. 1,069. January 21.
Electrical Switches. G. Binswanger. 1,072. January 21.
Hydrometers, Saccharometers, and Lactometers. G. C. Topp. 1,082. January 21.
Dealing with Spent Soda Lyes from Paper Mills. T. Goodall. 1,087. January 21.
Secondary or Storage Batteries.—(Complete Specification). H. H. Lake. 1,094. January 21.
Electrical Distribution.—(Complete Specification). H. H. Carpenter. 1,106. January 21.
The Treatment of Residues from Oil Manufacture. H. Noerdlinger. 1,109. January 21.
Galvanic Batteries.—(Complete Specification).—C. A. Hitchcock. 1,110. Jan. 21.
Manufacture of Chromium Compounds. J. Massignon and E. Watel. 1,117. January 21.
The Concentration and Distillation of Liquids. T. E. Wilson. 1,122. January 22.
Treatment of Spent Soap Lyes. C. W. Hazlehurst and S. Pope. 1,126. January 22.
Apparatus for Dyeing and Bleaching. G. Young and F. Pearn. 1,157. January 22.
Working Blast Furnaces. T. Turner. 1,161. January 22.
Boiler Feed Water Apparatus. A. E. Tavernier and E. Casper. 1,164. January 22.
Burning Tan and other Refuse Material. C. A. Brown. 1,170. Jan. 22.
Waterproofing Composition. W. Sinclair. 1,178. January 22.
Gas Burners. W. Hemingway. 1,184. January 22.
Machinery for Making Clay Goods. J. Morton. 1,194. January 23.
Silos. J. Wilson. 1,208. January 23.
Gas Burners. J. H. R. Paterson. 1,209. January 23.
Electric Lamps. J. A. McMullen. 1,226. January 23.
Alloys for Anti-friction Purposes. E. C. Miller. 1,227. January 23.
Regenerative Gas Furnaces. R. Mannesmann. 1,234. January 23.

Gas Compressors. R. Mannesmann. 1,235. January 23.
R. Mannesmann. 1,236. January 23.
Manufacture of Gas. R. Mannesmann. 1,237. January 23.
R. Mannesmann. 1,238. January 23.
Vaporising Liquids. D. Bethmont. 1,239. January 23.
The Electrolytic Generation of Chlorine. D. G. Fitz-Gerald and A. C. Falconer. 1,246. January 23.
Manufacture of Sugar. A. Fairgrieve. 1,247. January 23.
Compressing Gypsum. A. Moseley. 1,279. January 24.
Electrical Switches. C. L. Baker. 1,280. January 24.
Manufacture of Sugar.—(Complete Specification). C. D. Abel. 1,282. Jan. 24.
Boiler and Furnace Fires. O. Imray. 1,283. January 24.
Gas Producers. O. Imray. 1,284. January 24.
Barium Oxides.—(Complete Specification). H. H. Leigh. 1,300. January 24.
Filtering Apparatus. A. Capillary. 1,307. January 24.
The Production of Sterilised Milk.—(Complete Specification). A. Schmidt-Mülheim. 1,326. January 25.
Steam Engine Boilers. R. Hollingdrake. 1,330. January 25.
Oil Refining. F. H. Gray and S. S. Bromhead. 1,343. January 25.
Fluid for Primary Batteries. T. Coad. 1,347. January 25.
Apparatus for the Gasification of Fuels. W. L. Wise. 1,349. January 25.
Coating Metals for Prevention of Corrosion. A. E. Haswell and A. G. Haswell. 1,355. January 25.
Rough, Glazed, and Coloured Facing Stones.—(Complete Specification). A. J. Boulton. 1,355. January 25.
Manufacture of Candles. G. Bouton. 1,360. January 25.
Solution of Iodine for Medical Purposes. R. J. Downes. 1,380. Jan. 27.
Rotary Apparatus for Blowing, Exhausting, or Pumping Fluids. R. Johnson. 1,383. January 27.
Separating the Isomers contained in Crude Nitrotoluol. Martin Lange. 1,407. January 27.
Manufacturing Cumaron and its Homologues.—(Complete Specification). A. A. Vale. 1,422. January 27.
Manufacture of Metallic Compounds or Alloys. M. Netto. 1,427. Jan. 27.
Reduction of Metallic Ores and Apparatus therefor. J. T. King. 1,443. January 28.
Feed Water Purifiers for Steam Boilers.—(Complete Specification). C. A. Knight. 1,453. January 28.
Methode and Apparatus for Treating, Scouring, and Washing Wool. Jno. Smith, I. Smith, and Jos. Smith. 1,461. January 28.
Extracting Moisture from Wool and Cotton. J. B. Whiteley and E. Whiteley. 1,462. January 28.
Improvements in the Manufacture of Oilcake. F. C. Calthrop. 1,471. January 28.
Storage Batteries or Accumulators.—(Complete Specification). H. H. Lake. 1,495. January 28.
Extracting Substances Dissolved in Waste Water of Paper Works. F. C. Alkier. 1,514. January 28.
Digesters or Boilers for Manufacture of Paper Pulp.—(Complete Specification). W. W. Key. 1,517. January 28.
Coating Hoop Iron with Tin or Terne. T. H. Johns. 1,522. January 28.
Vaporising Solutions containing Nitrates of Manganese. G. Wischin. 1,524. January 28.
Kilns or Ovens for Burning Bricks, Earthenware, Limestone, Cement and other Articles.—(Complete Specification). I. Button, E. Peters, and J. W. Goodsell. 1,525. January 28.
Filtering or Purifying Feed Water for Steam Boilers. J. B. Edmiston. 1,571. January 29.
Manufacture of Azoamines by the Reduction of Azo-Colouring Matters. J. Imray. 1,579. January 29.
Improvements in the Manufacture of Soda and Potash. F. Ellershausen. 1,584. January 29.
Improvements in the Manufacture of Disinfectants. C. T. Kingzett. 1,589. January 29.
Mordanting and Dyeing Wool and Cotton Fibres. John Smith, Isaac Smith, and Joseph Smith. 1,607. January 30.
Apparatus for Treating Sewage. W. Warner. 1,623. January 30.
Machine for Extraction of Precious Metals by Chlorination and Amalgamation. F. K. S. Lowndes and J. C. Kaller. 1,625. January 30.
Improvements in Calcining and Refining Copper Ore.—(Complete Specification). F. W. Dähne. 1,641. January 30.
Improvements in the Manufacture of Soap. M. Perls. 1,650. Jan. 30.
Improvements in the Manufacture of Paper. M. Perls. 1,651. Jan. 30.
Extracting Oil and Grease from Cotton Waste. B. D. Barnett. 1,652. January 30.
Improvements in Saturators for Sulphate of Ammonia Plant.—(Complete Specification). G. Kennedy. 1,653. January 30.
Improvements in the Manufacture of Lime. M. B. Parrington. 1,654. January 30.
Manufacture of Lubricating Grease.—(Complete Specification). P. Flisson. 1,659. January 30.
Improvements in Carburing Gases and Purifying Hydro-Carbons. C. Heyer. 1,698. January 31.
Manufacture of Colouring Matters of the Induline Series. O. Imray. 1,699. January 31.
Antifouling Compositions. V. B. Lewes. 1,757. January 31.
Feed Water Heaters.—(Complete Specification). V. F. L. Smith. 1,761. January 31.
Yellow Dyes or Colouring Matters. T. R. Shillito. 1,771. January 31.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

The period Jan. 19th—Feb. 5th.

Alum—

Holland £230. Ohlenschlager Bros.

Acetic Acid—

Holland, 88 pkgs. A. & M. Zimmermann
Belgium, 20 Leach & Co.
Holland, 4 Beresford & Co.

Alumina Sulphate—

Holland, £160. C. S. Lovell
Antimony Ore—
France, 24 t. Pillow, Jones, & Co.
Austria, 10 H. R. Merton & Co.

Portugal, 5
Austria, 30
Oporto, 9
Portugal, 8
Salonica, 49
N. Zealand, 80

S. Serraz
H. R. Merton & Co.
Knowles & Co.
H. Emmanuel
N. Z. Anti-mony Co.

Austria, 49	H. R. Merton & Co.
Brisbane, 20	A. Hughes
" 4	Vivian, Youger & Co.
Austria, 4	Typke & King
A. Turkey, 35	Quirk, Barton, & Co.

Acetate of Lime—	
U. States, £189.	Johnson & Hooper

Alkali—	
France, 100 c.	Arnati & Harrison

Antimony—	
Japan, 67 t.	H. R. Merton & Co.

Ammonia Sulphate—	
Germany, £26	Pillow, Jones, & Co.

Bismuth—	
Germany, 49 c.	Grosscurth & Luboldt
Pt. Jackson, 4 t.	Skinner & Co.

Bones—	
U. States, 26 t.	H. A. Lane & Co.
France, 12 c.	Arnati & Harrison
Holland, 10 t.	J. Lucy & Sons
Belgium, 8	Sawer, Mead, & Co.
Germany, 12	W. Klein & Sons
N. S. Wales, 6	Goad, Rigg, & Co.
France, 6 c.	Hernu, Peron, & Co.
Queensland, 8 t.	Dyster, Nalder, & Co.
Cape, 30	D. de Pass & Co.
E. Indies, 200	Cornwall, Son, & Co.
" 178	"
" 150	A. Cross & Sons
" 125	L. & I. D. Jt. Co.
Queensland, 1	Brown & Elmalie
N. Zealand, 1	N. Z. L. and M. A. Co.
Belgium, 7 c.	D. C. Thomas & Son
E. Indies, 9 t.	R. & J. Henderson
Queensland, 5 t.	Anning & Cobb
Egypt, 110	Dyster, Nalder, & Co.
Queensland, 2	Hicks, Nash, & Co.
E. Indies, 150	Hunter, Waters, & Co.
U. States, 18	A. & W. Nesbitt
Queensland, 9 c.	Dyster, Nalder, & Co.

Barium Peroxide—	
Germany, £111.	W. Burston & Co.

Bone Meal—	
E. Indies, 300 t.	C. C. Bryden & Co.

Brimstone—	
Italy, 23 t.	G. Boor & Co.
" 24	Chilworth Gunpowder Co.
" 3	Typke & King
" 20	A. Zumbek & Co.
" 300	W. C. Bacon & Co.
Philippine Isles, 10 t.	F. Parbury & Co.
Italy, 4	Soudy & Son
Belgium, 16	Bull, Bevan, & Co.
France, 1	E. W. Carling & Co.
Italy, 100	J. Stutchbury & Sons

Barytes—	
Germany, 40 cks.	W. Harrison & Co.
Belgium, 21 cks. 9 pkgs.	"
" 210 bgs.	Leach & Co.
Holland, 46 cks.	W. Harrison & Co.
Germany, 22	"
" 69	D. Sterer & Sons
Belgium, 11	E. W. Carling & Co.
" 11	T. H. Lee
" 104	A. Zumbek & Co.
Germany, 19	P. Jantzen
" 22	Pillow, Jones, & Co.
" 23	W. Harrison & Co.
" 19	H. A. Litchfield & Co.
" 69	S. Ward & Co.

Boracic Acid—	
Italy, 50 pkgs.	J. Batt & Co.
" 9	J. Puddy & Co.
Germany, 6	Beresford & Co.
Italy, 25	Howard & Sons

Barium Chloride—	
Holland, £90.	Petri Bros
Germany, 75	"

Bromine—	
Germany, £100.	A. & M. Zimmermann
" 163	Craven & Co.

Caustic Soda—	
Aden, 50 c.	L. & I. D. Jt. Co.
France, 2	Hoare, Wilson, & Co.
Greytown, 14	C. de Murietta & Co.
France, 310	T. H. Lee
E. Indies, 104	Huttenbach & Co.
Spain, 20	Kebbel, Son, & Co.
Madagascar, 6	"
Cape, 80	Hammond & Co.
E. Indies, 23	Adamson, Giffillan & Co.

Natal, 13	J. Owen
Cape, 4	W. M. Smith & Sons
U. States, 37	Kebbel, Son, & Co.
E. Indies, 19	L. & I. D. Jt. Co.
E. Africa, 38	"
E. Indies, 82	Huttenbach & Co.
Portugal, 334	W. Brandt, Sons, & Co.
E. Africa, 25	Anderson, Weber, & Smith
Natal, 56	Ross & Deering
Cape, 65	Union Lighterage Co.
Madagascar, 155	Carey & Browne
E. Africa, 5	L. & I. D. Jt. Co.
Madagascar, 374	Kebbel, Son, & Co.
N.E. Africa, 71	Union Lighterage Co.
France, 250	T. H. Lee
E. Indies, 65	J. H. & G. Scovell
E. Africa, 16	Anderson, Weber, & Smith

Cream Tartar—	
France, 5 pkgs.	Webb, Warter, & Co.
" 5	C. F. Gerhardt
Holland, 20	W. C. Bacon & Co.
Spain, 5	F. Smith
Italy, 11	Webb, Warter, & Co.
" 48	R. Jacob & Sons
" 6	R. Tacker & Co.
" 120	Leager, White, & Co.
" 14	Webb, Warter, & Co.
Holland, 85	Credit Lyonnais
" 10	N. Smith
" 4	Middleton & Co.
Italy, 5	Webb, Warter, & Co.
France, 4	E. W. Carling & Co.
" 5	B. & F. Wf. Co.
" 20	W. C. Bacon & Co.

Chemicals (otherwise undecorated)	
Germany, £357.	A. & M. Zimmermann
" 125	T. H. Lee
Belgium, 13	Best, Ryley, & Co.
" 8	R. E. Drummond & Co.
Spain, 26	J. Hall, Jr. & Co.
Germany, 8	Phillipps & Graves
" 8	J. Elinguis
Holland, 10	Beresford & Co.
Germany, 679	A. & M. Zimmermann
" 25	Phillipps & Graves
" 114	A. & M. Zimmermann
Holland, 20	H. Boyce
" 25	Ohlenschlager Bros.
France, 29	Carey & Sons
Germany, 18	Ross & Deering
" 58	T. H. Lee
" 430	A. & M. Zimmermann
Holland, 20	Phillipps & Graves
Germany, 102	T. H. Lee
" 302	A. & M. Zimmermann
" 24	"
" 28	F. Stahlenschmidt & Co.
Italy, 15	Hughes, Chemery, & Co.
Germany, 756	A. & M. Zimmermann
" 30	L. & I. D. Jt. Co.
Holland, 10	"
Germany, 139	J. Parlevliet
" 93	T. H. Lee
" 115	A. & M. Zimmermann
" 115	C. Faust & Co.

Caustic Potash—	
France, 21 pkgs.	Fuerst Bros.
" 21	Carey & Sons
" 21	F. W. Berk & Co.

Camphor—	
Germany, 4 tubs.	L. & I. D. Jt. Co.
" 4 pkgs.	"
Japan, 345 tubs.	A. Faber & Co.

Copper Ore—	
Pt. Augusta, 23 t.	Harrold Bros.
N. Zealand, 3	L. & I. D. Jt. Co.
Sydney, 54	J. A. Drew
" 7	F. Manders
Melbourne, 15	Vivian & Sons

Cobalt Ore—	
Sydney, 76 t.	Fellows, Morton, & Co.

Copper Sulphate—	
Germany, £60.	Charles & Fox

Caustic Soda—	
Holland, 90 c.	Beresford & Co.
" 200	"

Carbonic Acid—	
Holland, 73 pkgs.	G. Rahn & Co.

Dyestuffs—	
Holland, 35 pkgs.	Burt, Boulton & Co.
France, 25	B. & F. Whf. Co.
" 295	L. J. Levinstein & Sons
" 23	Forbes, Abbott, & Co.
" 20	L. J. Levinstein & Sons
Holland, 28	Burt, Boulton, & Co.
France, 70	G. S. N. Co.

Belgium, 35	Burt, Boulton, & Co.
U. States, 100	M. D. Co.
Belgium, 36	Burt, Boulton, & Co.
Holland, 68	Union Lighterage Co.
Denmark, 21	A. F. White & Co.
France, 245	L. J. Levinstein & Sons
" 50	W. France & Co.
" 100	Bailey & Leatham
Austria, 82	L. J. Levinstein & Sons
France, 25	T. H. Lee
" 20	Levinstein & Sons
Holland, 2	J. Sinclair & Son
Tanners' Bark	
Victoria, 92 t.	T. J. & T. Powell
U. States, 55	S. E. Dk. Co.
" 50	G. Meyer & Co.
" 1	C. F. Gerhardt
Belgium, 30	H. Henle's Succr.

Gambier	
E. Indies, 169 pkgs.	P. S. Evans & Co.
" 842	E. Boustead & Co.
" 301	S. Barrow & Bro.
" 564	Beresford & Co.
" 205	Elkan & Co.
" 590	R. & J. Henderson
" 413	Anderson, Weber, & Smith
" 515	L. & I. D. Jt. Co.
" 199	Lewis & Peat
" 430	Johnson, Rolls, & Co.
" 634	Adamson, Giffillan, & Co.
" 207	Elkan & Co.
" 272	S. Barrow & Bro.
" 216	Adamson, Giffillan, & Co.
" 283	Lewis & Peat
" 420	L. & I. D. Jt. Co.
" 843	"
" 418	Hoare, Wilson, & Co.
" 435	J. H. & G. Scovell
" 477	L. & I. D. Jt. Co.
" 416	Hoare, Wilson, & Co.

Indigo	
E. Indies, 13 cks.	L. & I. D. Jt. Co.
" 27	T. Barlow & Bros.
" 10	T. W. Heilgers & Co.
" 88	L. & I. D. Jt. Co.
" 229	4 bxs. G. Ward & Sons
" 34	A. Harvey
" 102	T. H. Allen & Co.
" 1	Parsons & Keith
" 15	Bencke, Souchay & Co.
" 78	Arbuthnot, Latham, & Co.
" 33	J. Owen
" 7	"
" 150	T. Ronaldson & Co.
" 69	T. Hallen & Co.
" 15	Fruhling & Goschen
" 13	Anderson Bros.
" 32	L. & I. D. Jt. Co.
" 20	Langstaffe & Co.
" 32	F. Huth & Co.
" 46	L. & I. D. Jt. Co.
S. W. I. 8	Patry & Pasteur
E. Indies, 1 bx.	Elkan & Co.
" ocs.	Pickford & Co.
" 12 cts.	W. Brandt, Sons, & Co.
Greytown, 10	Cotesworth & Powell
E. Indies, 32	L. & I. D. Jt. Co.
" 21	Elkan & Co.
" 6	Gray, Dawes, & Co.
" 58	J. Owen
" 9	F. Huth & Co.
" 22	L. & I. D. Jt. Co.
" 10	Union Lighterage Co.
" 87	Ross & Deering
" 12	Elkan & Co.
" 4	A. Harvey & Co.
" 3	Ernsthausen & Co.
" 22	Hatton, Hall, & Co.
" 97	Vokins & Co.
" 30	G. Dards
" 7	Schenker & Co.
" 24	7 cs. Langstaffe & Co.
" 28	J. Owen
" 9	T. H. Allan & Co.
" 27	Kleinwort, Sons, & Co.
" 132	Ldn. & Hanseatic Bank
" 3	L. & I. D. Jt. Co.
" 10	Patry & Pasteur
" 10	Union Lighterage Co.
" 25	L. & I. D. Jt. Co.
" 55	T. Ronaldson & Co.
" 191	Williams, Torrey, & Co.
" 7	P. & O. Co.
" 8	Ralli Bros.
" 19	G. Dards
" 6	Hoare, Miller & Co.
Holland, 3	Stansbury & Co.
E. Indies, 37	Ldn. & Hanseatic Bank
" 7	L. & I. D. Jt. Co.
" 70	Elkan & Co.
" 1	Darling Bros.
" 15	L. & I. D. Jt. Co.
" 38	Ross & Deering
" 238	F. Huth & Co.
" 238	Langstaffe & Co.
" 238	L. & I. D. Jt. Co.

" 16	"
" 1	"
" 7	"
" 10	"
" 10	"
" 5	"
" 3	"
" 4	"
" 1	"
" 2	"
" 2	"
Bannet	
Germany, 3	
Denmark, 3	
Valonia	
A. Turkey, 1	
" 8	
" 5	
" 6	
Safflower	
E. Indies, 10	
Myrabolan	
E. Indies, 1	
" 2	
" 1,6	
" 1	
" 1	
" 1	
" 1	
" 1	
Orchella	
Portugal, 1	
W. Africa, 1	
E. Africa, 1	
Ceylon, 1	
Samao	
Italy, 1	
Aniline	
Holland, 1	
Angola	
Cape, 1	
Cochineal	
Canaries, 1	
"	
"	
"	
Annatto	
Ceylon, 1	
Dyestuffs	
France, 1	
Saffron	
Spain, 1	
Guth	
E. Indies, 4	
Glycerine—	
France, £44	
Germany, 15	
"	
"	
Holland, 7	
"	
France, 1	
Germany, 1	
Holland, 1	
Germany, 1	
Glucose—	
France, 100	
" 380	
" 200	
Germany, 63	
Belgium, 200	
" 50	
" 350	
Germany, 85	
" 70	
" 30	
France, 100	
Germany, 200	
Belgium, 100	
Germany, 125	
" 35	
" 13	
" 25	
" 500	
" 300	

800 J. Cooper 200 L. Sutro & Co. ates, 100 554 W. Parkinson any, 12 100 Page, Son, & East 80 Barrett, Tagant, & Co. ce, 200 100 Carey & Son any, 200 205 J. Cooper " 4 22 Henderson, " 21 168 Craig, & Co. " 100 100 C. Tennant, " 35 193 Anderson, Weber, & Co. " 50 425 Andersen, " 200 200 Becker, & Co. " 13 100 J. Barber & Co. " 28 240 L. & I. D. Jt. Co. " 200 200 Howell & Co. " 13 120 Union Lighterage Co. " 200 203 Horne & Co. " 100 100 Barrett, Tagant, & Co. " 200 200 J. Barber & Co. " 25 200 Pillow, Jones, & Co. " 4 34 T. H. Lee " 200 200 Horne & Co. " 25 210 L. & I. D. Jt. Co. " 400 400 H. A. Lichfield " 19 160 C. Tennant, " 25 200 J. Barber & Co. " 955 984 K.E. Drummond & Co. J. States, 800 800 Barrett, Tagant, & Co. Germany, 23 170 C. Tennant, " 200 200 J. Barber & Co. " 200 200 Horne & Co. U. States, 500 500 M. D. Co. Atta Percha— E. Indies, 533 c. Kaltenbach & Schmitz Germany, 1 L. & I. D. Jt. Co. E. Indies, 272 Huttenbach & Co. " 556 Kleinwort, Sons, & Co. " 730 Jewesbury & Co. " 600 R. & J. Henderson " 901 Kaltenbach & Schmitz " 245 Huttenbach & Co. " 80 Soundy & Co. " 485 J. H. & G. Scovell " 705 H. W. Jewesbury & Co. U. States, 59 J. H. & G. Scovell Guano— Chili, 787 t. Anglo Cont. Guano Works inglass— E. Indies, 103 pkgs. L. & I. D. Jt. Co. " 29 Clarke & Smith Germany, 6 Williams & Co. E. Indies, 30 L. & I. D. Jt. Co. B. W. Indies, 1 pkgs. W. M. Smith & Sons Holland, 3 Pearson & Co. China, 8 L. & I. D. Jt. Co. E. Indies, 3 Hale & Son B. W. Indies, 2 W. M. Smith & Sons " 1 Malcolm, Kearton, & Co. S. Settlements, 8 L. & D. Jt. Co. E. Indies, 78 " isect Powder— Austria, £30. H. Ruback " 45 W. Jacques agnesia— Holland, £30. Beresford & Co. auure— Phosphate Rock France, 150 t. T. Farmer & Co. " 50 W. H. Carey & Sons Belgium, 120 Lawes Manure Co. France, 136 Anglo. Contl. Guano Works " 125 Moeller, Graetz, & Co. " 540 Anglo. Contl. Guano Works " 156 Lawes Manure Co. " 20 Anglo. Contl. Guano Works " 115 A. Hunter & Co. " 176 Anglo. Contl. Guano Works Manure (otherwise underscribed) U. States, 11 t. Rose, Wilson, & Co. Germany, 20 Petri Bros. " 50 Hunter, Waters, & Co.	Manganese Ore— Pt. Augusta, 370 t. Harrold Bros. Manganese Borate— Germany, £126. T. H. Lee Naphtha— Germany, 13 brls. Stein Bros. Holland, 190 Lister & Biggs Germany, 4 Stein Potassium Carbonate— France, 9 pkgs. Beresford & Co. Germany, 5 Anderson, Becker, & Co. Potassium Bicarbonate— Holland, 10 pkgs. A. & M. Zimmermann Potassium Sulphate— Holland, 10 pkgs. Carey & Sons Germany, 102 D. de Pass & Co. Holland, 10 Hernu, Peron & Co. Germany, 27 Webb, Warter, & Co. Plumbago— Ceylon, 184 cks. Beresford & Co. " 65 J. Swire & Sons " 184 Props. Chamberlains Whf. Germany, 100 cs. Beresford & Co. Ceylon, 310 brls. H. W. Ison " 152 cks. J. Thredder, Son, & Co. Holland, 28 Brown & Elmslie Ceylon, 85 L. & I. D. Jt. Co. " 55 Doulton & Co. " 94 J. Thredder, Son, & Co. Pearl Ash— France, 100 c. F. W. Berk & Co. " 380 " 100 Petri Bros. Potash— France, 5 pkgs. J. A. Reid Germany, £30. L. & I. D. Jt. Co. France, 90 J. A. Reid Pitch— Holland, 12 brls. Rosenberg, Lowe, & Co. Potassium Prussiate— Holland, £75. T. H. Lee Paraffin Wax— U. States, 126 brls. H. Hill & Sons Quinine— France, £3,740 L. & I. D. Jt. Co. Holland, 100 Keibel, Son, & Co. " 124 F. W. Heilgers & Co. Sodium Nitrate— Holland, £16. C. Faust & Co. Strontium Nitrate— Holland, £276. G. Boor & Co. Sal ammoniac— Holland, £110. Barr, Moering, & Co. " 90 Barr, Moering & Co. Saltpetre— Germany, 61 cks. J. Hall & Son " 50 T. Merry & Son " 72 Soundy & Son E. Indies, 670 L. & I. D. Jt. Co. U. States, 4 pkgs. H. W. Ison Germany, 118 cks. P. Hecker & Co. " 321 C. Wible & Co. " 34 Craven & Co. " 100 T. Merry & Son " 48 38 pkgs. P. Hecker & Co. " 78 " 60 C. Wible & Co. " 635 bgs. Hunter, Waters, & Co. Stearine— France, 148 sks. J. Goddard & Co. " 144 Germany, 6 cs. L. & I. D. Jt. Co. Holland, 125 bgs. H. Hill & Sons France, 12 cks. J. Goddard & Co. Salicylic Acid— Germany, 16 pkgs. Burgoyne, Burtidge & Co. Sodium Sulphate— Holland, £14. Hernu, Peron, & Co. Soda— Holland, 200 c. Henderson, Craig, & Co. Sugar of Lead— Germany, 1 pkg. L. & I. Jt. Co. Tartaric Acid— Holland, 4 pkgs. A. Hopf & Co. " 5 Northcott & Sons " 34 Webb, Warter, & Co. Italy, 40 Holland, 11 Middleton, & Co. " 4 Hernu, Peron, & Co. " 34 Webb, Warter, & Co. France, 9 Holland, 8	Tartar— Italy, 22 pkgs. 40 " 11 Tartar Salts— Germany, £36. Charles & Fox Tar— Germany, 50 brls. W. Peters & Sons Ultramarine— Holland, 2 cks. G. Rahn & Co. " 12 pkgs. Haefner, Helpert, & Co. Germany, 100 cs. Evon Rehn Belgium, 9 pkgs. W. Harrison & Co. Germany, 29 cs. G. Steinhoff Holland, 13 pkgs. Ohlenschlager Bros. Germany, 12 cs. G. Steinhoff " 4 H. Brooks & Co. Holland, 9 pkgs. Ohlenschlager Bros. Belgium, 20 Arnati & Harrison Germany, 9 G. Steinhoff Belgium, 12 cks. Leach & Co. France, 22 cs. Haefner, Helper, & Co. Zinc Oxide— Germany, 10 cks. R. W. Greef & Co. Belgium, 150 J. Matton Holland, 125 M. Ashby " 20 brls. Beresford & Co. " 250 N. Smith " 170 cks. M. Ashby U. States, 100 Holland, 65 " 500 U. States, 125 cks. Soundy & Son Holland, 50 M. Ashby	Salt Pond, 1 S. & C. Nordlinger " 8 4 cs. Pickering & Berthoud " 5 4 W. Griffiths & Co. " 2 Edwards Bros. " 7 F. & A. Swanzy " 1 Pitt, Bros. & Co. " 2 W. B. McIver & Co. " 3 Fletcher & Fraser " 10 I. J. Fischer & Co. Cape Coast, 1 A. Millerson & Co. " 2 1 H. B. W. Russell " 1 Pickering & Berthoud " 2 1 C. L. Clare & Co. " 3 1 Fletcher & Fraser " 10 Edwards Bros. Dixcove, 1 bx. Havard & Co. Assinee, 1 bg. 3 Millward, Bradbury & Co. " 2 F. & A. Swanzy " 1 A. Verrier " 1 1 W. D. Woodin " 1 Pickering & Berthoud " 8 A. Millerson & Co. " 2 M. Ridyard " 5 W. Duff & Co. " 2 W. D. Woodin Grand Bassam, 6 pns. A. Verrier " 11 brls. 3 cs. F. & A. Swanzy " 3 bgs. A. Reis " 2 J. Stadelman " 3 1 W. D. Woodin " 1 M. Levin " 1 6 Millward, Bradbury & Co. " 6 Edwards Bros. " 3 1 cs. A. Millerson & Co. " 1 2 brls. A. Ridyard " 1 Pickering & Berthoud Grand Bassa, 3 Cie Francaise " 1 ck. H. S. Attia Bros. Sierra Leone, 31 Broadhurst, Son, & Co. " 3 pns. 3 Paterson, Zochonis, & Co. " 4 44 A. Dobell & Co. Colon, 6 R. Singlehurst & Co. Ceara, 4 " 20 Rosing, Bros., & Co. Pernambuco, 2 T. Turner Boston, 16 cs. F. & A. Swanzy Quittah, 7 Royal Niger Co. Ltd. Akassa, 118 bgs. J. H. Rayner & Co. Quittah, 1 J. H. Rayner & Co. Accra, 2 cks. 1 cs. 18 brls. Pickering & Berthoud " 5 F. F
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Sumac
Barcelona, 50 bgs.
Palermo, 200
1,660 J. Kitchin

Divi Divi
Hamburg, 247 bgs.
Extracts
St. Nazaire, 25 cks.
Boston, 5 brls. Crown Cheml. Co.
Havre, 1 ck. Cunard S. S. Co. Lmtd.

Bordeaux, 25 cks.
Philadelphia, 20 brls.
Rouen, 553 cks. Co-op. W'sale Socy., Lmtd.
Trieste, 41 brls. L. J. Levinstein & Sons

Indigo
Calcutta, 268 chts. Baring, Bros. & Co.
" 116 H. Morgan & Co.
" 39 cks. Brown, Bros. & Co.
" 66 J. L. D. & S. Riker

Argols
Bordeaux, 84 brls.
Brindisi, 22 cks.
Bordeaux, 156

Orchella
Lisbon, 73 pkgs. A. Barbosa & Co.
Annatto
St. Nazaire, 10 cks.
Cochineal
Grand Canary, 9 bgs. Kuhner, Hendschel, & Co.
" 38 H. R. Toby
" 69 Beach & Co.
Las Palmas, 30 H. M. Coly & Co.
" 50 Lathbury & Co.
Teneriffe, 11 H. R. Toby & Co.
Grand Canary, 43 Lathbury & Co.
Teneriffe, 25 German Bank, London
" 12 Bruce & White

Glycerine
Marseilles, 3 brls. R. J. Francis & Co.
Havre, 200 cs. Cunard S. S. Co., Lmtd.

Bordeaux, 6 cks.
Rotterdam, 2 dms.
Amsterdam, 6 carboys 3 cs.
Hamburg, 1 dm.

Glucose
Hamburg, 278 cks.
Philadelphia, 200 brls.
Hamburg, 5 cks. D. Currie & Co.
Bordeaux, 40 brls.

Gum
Rio Grande, 537 bgs.

Horn Piths
Rio Grande, 12,000

Iodine
Valparaiso, 93 brls. A. Gibbs & Son

Manganese
Hamburg, 4 cks.
Rotterdam, 8

Naphthaline
Barcelona, 11 brls.

Pitch
Amsterdam, 17 cks.
Rotterdam, 63

Phosphate
Ghent, 1,610 bgs.
" 2,550 J. T. Fletcher & Co.

Potash
Portland, 50 brls.
Rouen, 83 cks. Co-op. W'sale Socy., Lmtd.

Potassium Prussiate
Hamburg, 1 ck.

Phosphate of Lime
Trepport, 450 t.

Paraffin Wax
Rangoon, 657 bxs.

Pyrites
Huelva, 3,123 t.
" 3,025 Matheson & Co.
" 1,225 Tennants & Co.
" 1,800

Stearine
Antwerp, 23 bgs.

Sugar of Lead
Hamburg, 46 brls. 1 ck.
Rotterdam, 30 cks.

Saltpetre
Hamburg, 160 cks.
Calcutta, 371 bgs.

Sodium Acetate
Rouen, 9 cks. Co-op. W'sale Socy., Lmtd.

Tartar Salts
Rotterdam, 25 cks.

Tar
New York, 320 brls.

Tartar
Bordeaux, 4 cks.

Tartaric Acid
Rotterdam, 20 kgs. 32 cks.

Ultramarine
Rotterdam, 12 cks. 4 cs.

Verdigris
Bordeaux, 3 cks.

Zinc Oxide
St. Nazaire, 25 brls.

Zinc Ashes
Antwerp, 50 36 cks.
Trieste, 9 brls.
Boston, 14

HULL.

The period Jan. 22nd—Feb. 7th.

Acid (otherwise undescribed)
Rotterdam, 4 cks. Hutchinson & Sons

Bark
Antwerp, 991 bgs. Bailey & Leatham
305

Barytes
Antwerp, 42 cks. Bailey & Leatham
Bremen, 22 Veltmann & Co.
" 12 Gibson Bros.
" 23 Tudor & Son
" 7 Cammell, Woolf, & Haigh
" 57 T. W. Flint & Co.
" 42 Blundell, Spence & Co.
" 22
" 40 T. W. Flint & Co.
" 124
Rotterdam, 23 brls.

Caoutchouc
Hamburg, 1 cs. C. M. Lofthouse

Chemicals (otherwise undescribed)
Bremen, 1 pkg. Veltmann & Co.
Dunkirk, 77 pkts, 9 cks. Wilson, Sons & Co.
Antwerp, 5 cks. Wilson, Sons & Co.
Bari, 62 drms. " Veltmann & Co.
Bremen, 3 cs. " & Co.
Rotterdam, 2 cs. Hutchinson & Son
Hamburg, 1 brl. 2 cases 92 pkgs. Wilson, Sons & Co.
Antwerp, 69 pkg. Wilson, Sons & Co.
Dunkirk, 83 pkgs. " " & Co.
Rotterdam, 1 ck. Hutchinson & Son

Colours
Bremen, 4 cks. Veltmann & Co.
" 4 Cammell, Woolf, & Haigh
" 6 Hargreaves, Bros. & Co.
" 8 Reckett & Sons
Rotterdam, 2 pkgs. W. & C. L. Ringrose
Hamburg, 9 20 cases Wilson, Sons & Co.
Rotterdam, 21 cks. 2 Hutchinson & Son
" 2 Geo. Lawson & Sons
" 1 cs. Wilson, Sons & Co.
" 30 cks. 10 cs. W. & C. L. Ringrose
Hamburg, 1 cs. Bailey & Leatham
Ghent, 43 cks. Wilson, Sons & Co.
Rotterdam, 1 ck. Hutchinson & Son

Hamburg, 2 cs. C. M. Lofthouse & Co.
Bremen, 5 cs. Veltmann & Co.
Rotterdam, 13 pkgs. W. & C. L. Ringrose
" 14 cs. 9 cks. Hutchinson & Son
Antwerp, 34 cks. Wilson, Sons & Co.
Rotterdam, 1 brl. Hutchinson & Son
" 25 pkgs. 3 cks.

Drugs
Hamburg, 49 pkgs. Wilson, Sons & Co.
" 4 lb. Bailey & Leatham
Trieste, 42 pkgs. Wilson, Sons & Co.
" 1 cs. W. & C. L. Ringrose
Hamburg, 14 Wilson, Sons & Co.

Dyestuffs
Myrabolams
Bombay, 1,599 pkgs.

Alizarine
Rotterdam, 53 cks. 3 cases Hutchinson & Son
" 10 cks.
" 9 1 case W. & C. L. Ringrose
" 25 pkgs. W. & C. L. Ringrose
" 20 cks. Hutchinson & Son
" 54 pkgs. 42 cks. W. & C. L. Ringrose
" 20 cks. Hutchinson & Son
" 1 cs. W. & C. L. Ringrose
" 16 Hutchinson & Son

Sumac
Trieste, 195 bales Wilson, Sons & Co.
Palermo, 125 bgs. " " " " 1,050

Extracts
Trieste, 80 cks. Wilson, Sons & Co.
Dunkirk, 33 " " "

Farina
Harlingen, 25 bgs. W. & C. L. Ringrose
Rotterdam, 415 " " "
Harlingen, 1,878
Stettin, 100 Wilson, Sons & Co.
Hamburg, 25 C. M. Lofthouse & Co.
" 71 Wilson, Sons & Co.

Glucose
Hamburg, 5 carboys 20 bgs.
" 16 cks. Bailey & Leatham
" 900 bgs. C. M. Lofthouse & Co.
Stettin, 44 cks. Wilson, Sons & Co.
" 15 cs. Bailey & Leatham
Hamburg, 12 " " "
" 7 " " "
" 5 cks. Wilson Sons & Co.

Glue
Hamburg, 100 bgs.
Rotterdam, 50 cs. George Lawson & Sons
Antwerp, 5 cks. Bailey & Leatham

Logwood
Hamburg, 50 bgs. Wilson, Sons & Co.

Manure
Antwerp, 100 tons Wilson, Sons & Co.

Muriate Potash
Hamburg, 5 bgs. Wilson, Sons & Co.

Naphthaline
Rotterdam, 1 ck. W. & C. L. Ringrose

Naphthol
Rotterdam, 1 ck. W. & C. L. Ringrose

Ochre
Bremen, 42 cks. Hanger, Watson, & Harris
" 1 Todd & Son

Petroleum
New York, 9,871 brls.

Phosphorus
Antwerp, 1 cs. Wilson, Sons & Co.
Rouen, 10 cs. Rawson & Robinson

Pitch
Antwerp, 10 cks. Wilson, Sons & Co.
Ghent, 96 " " "

Potash
Antwerp, 22 pkgs. Wilson, Sons & Co.
Dunkirk, 49 cks. " " "

Saltcake
Hamburg, 11 pkgs. Wilson, Sons & Co.
" 2 cks.

Soap
Hamburg, 19 cs. Wilson, & Co.

Soda
Rotterdam, 12 cks. Hutchinson & Sons

Sodium Nitrate
Rotterdam, 1 ck. W. & C. L. Ringrose

Stearine
Antwerp, 78 bgs. Wilson, Sons & Co.

Sulphur
Catania, 380 brls. 435 bgs. 61 tons Wilson, Sons & Co.

Tallow
New York, 175 brls. Wilson, Sons & Co.

Tannin
Hamburg, 2 cks. Wilson, Sons & Co.
Rotterdam, 20 Hutchinson & Sons

Ultramarine
Hamburg, 5 cks.

Varnish
Rotterdam, 1 box 1 hamper Hutchinson & Son

White Lead
Antwerp, 61 cks. Bailey & Leatham
" 84 " " "

Wood Pulp
Kallundborg, 30 tons

Zinc
Antwerp, 6 pk

Zinc Oxide
Rotterdam, 4 cs 2 ck
" 2
" 20

GLAI
The period, Jan

Aluminium Sul
Amsterdam, 11 c

Ammonia
Rotterdam, 1 c

Bone Meal
Bombay, 5,000 b

Barytes
Rotterdam, 92 cl

Chemicals (othe
Rotterdam, 7
Hamburg, 2
Christiania, 8

Cream Tartar
Marseilles, 5 b

Caoutchouc
Baltimore, 278 l

Colours
Rotterdam, 5 cs.

Dyestuffs
Dyedwood Exts
Antwerp, 15 cks
" 1 cs.

Alizarine
Rotterdam, 120 c
" 127
" 48
" 191

Dyedwood
Rouen, 100 bxs.
Bark Extract
Baltimore, 12 brls.
Logwood Exts
Rotterdam, 2 c

Logwood Root
Jamaica, 620 t.

Esparto Grass
Oran, 1,122 t.
Amsterdam, 378

Farina
Rotterdam, 50 br

Glycerine
Marseilles, 6 br

Manure
Bilbao, 330 t.
" 100

Oxalic Acid
Christiania, 20 cl

Ochre
Marseilles, 25 b

Phosphate of L
Rouen, 206 l

Potash
Christiania, 31
Rotterdam, 20

Rosin
New York, 21,491
" 507

Red Lead
Rotterdam, 16

Stearine
Rotterdam, 24 cks.

Tannin
Hamburg, 1 ck.

Ultramarine
Rotterdam, 3 cs.

Wax
Baltimore, 308 brls

Wood Pulp
Christiania, 3,291
" 4,491
Amsterdam, 4,681
Christiania, 4,194

White Lead
Rotterdam, 36
" 23
" 12
" 36

Zinc Ashes
Antwerp, 7

Zinc Oxide
Rotterdam, 20
Antwerp, 50
Rotterdam, 15
New York, 25

TYNE.*The period, Jan. 24th—Feb. 7th.*

Acetic Acid—		
Rotterdam, 94 cbs.	Tyne S.S. Co.	
Barytes—		
Antwerp, 22 cks.	Tyne S.S. Co.	
Rotterdam, 46	"	
Chemicals (otherwise undescribed)		
Hamburg, 2 cs.	Tyne S.S. Co.	
Glucose—		
Hamburg, 10 cs.	Tyne S.S. Co.	
" 12 cks.	"	
Glycerine—		
Hamburg, 6 cs. 3 clys. 1 drum.	Tyne S.S. Co.	
Manure—		
Phosphate Rock		
Port Royal, 2,250 t.	Langdale's Cheml. Manure Co.	
Manganese Ore—		
Antwerp, 20 t.	Tyne S.S. Co.	
Phosphate—		
Antwerp, 190 t.	Langdale's Cheml. Co.	
Pyrites—		
Huelva, 2,185 t.	Scott Bros.	
Drontheim, 550	R. S. Storey & Co.	

Saltpetre—

Hamburg, 37 cks.	Tyne S.S. Co.
Soda—	
Rotterdam, 17 cks.	Tyne S.S. Co.
Ultramarine—	
Rotterdam, 2 cks.	Tyne S.S. Co.
Zinc Oxide—	
Antwerp, 25 brie.	Tyne S.S. Co.

GOOLE.*The period Jan. 24th—Feb. 7th.*

Alizarine—		
Rotterdam, 56 cs.		
" 4		
Alum—		
Rotterdam, 15		
" 12		
Antimony—		
Boulogne, 1 cks.		
Charcoal—		
Boulogne, 6 cs.		
" 17		
Chemicals (otherwise undescribed)		
Rotterdam, 7 pkgs.		

Dyestuffs—

Boulogne, 22 cases	
" 143 cks.	
" 64	
" 26 cases	

Glucose—

Hamburg, 39 cks.	
" 200 bgs.	
" 23 cks.	

Glycerine—

Rotterdam, 10 cases	
" 20 pkgs.	

Glue—

Rotterdam, 20 bgs.	
Hamburg, 20	
Boulogne, 11 cks.	

Iron Pyrites—

Huelva, 1,129 tons	
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Ochre—

Rouen, 30 cks.	
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Potash—

Dunkirk, 90 drms.	
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" 12 cks.	
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Calais, 83 drms.	
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Phosphates—	
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Ghent, 1,600 bgs.	
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" 800	
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Plumbago—

Boulogne, 1 ck.	
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Saltpetre—

Rotterdam, 244 bgs.	
Hamburg, 34 cks.	
Antwerp, 270 bgs.	

Silicate of Soda—

Rotterdam, 10 cks.	
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Waste Salt—

Hamburg, 102 bgs.	
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GRIMSBY*The period Jan. 19th—Feb.***Chemicals (otherwise under)**

Hamburg, 5 cks. 3 pkgs.	
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Dyestuffs (otherwise under)

Antwerp, 10 cks.	
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Extracts

Dieppe, 45 pkgs.	
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Glucose—

Hamburg, 44 pkgs.	
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Size—

Rotterdam, 5 pkgs.	
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Antwerp, 5	
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Hamburg, 11 cks.	
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Antwerp, 4 bales.	
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EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.***The period Jan. 13th—Feb. 1st.*

Ammonium Carbonate—		
Dunkirk, 18 cwts.	£27	
Rangoon, 3	18	
Rosario, 1	32	
Acids—		
Sydney, 300 pkgs.	£30	
Cologne, 457		
Reval, 100 cs.	250	
Berlice, 6 cbs.	30	
" 6	30	
Alum—		
Salonica, 5 t. 1 c.	£28	
" 4 10 c.	£27	
Saffi, 8 2	49	
Cassablanca, 8	48	
Varna, 49	13	
Rabat, 32	10	
Ammonia—		
Singapore, 116 lbs.	18	
Constantinople, 51		
Hamburg, 94		
Constantinople, 1 t. 4 lbs.	45	
Amorphous Phosphorus—		
Hong Kong, 4 c.	£55	
Yokohama, 10 cs.	131	
Hio, 2,000 lbs.	277	
Borax—		
Cordova, 20 cwts.	£32	
Amsterdam, 39	191	
Sydney, 40	61	
Rosario, 74		
Monte Video, 30		
Brimstone—		
Santos, 48		
Bichromate of Potash—		
Otago, 15 c.	£26	
Salonica, 8	15	
" 14 cwts.	30	
Odessa, 20	36	
Hong Kong, 6	11	
Bisulphide of Carbon—		
Rio Janeiro, 65		
Caustic Potash—		
Hong Kong, 5 cwts.	£12	
Caustic Soda—		
Algoa Bay, 1,250 lbs.	£27	
Trinidad, 2 t. 7	31	
New York, 10	15	
Calcutta, 3 t.	20	
Carbolic Powder—		
Otago, 25	£25	
Camphor—		
Melbourne, 1 ck.	£46	
Sydney, 3 c.	29	
" 205		

Corrosive Sublimate—

Tangiers, 1 cwt.	£15
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Carbolic Acid—

Rotterdam, 5 t.	£529
Algoa Bay, 1 4 c.	26
New York, 2 cs.	10
Yokohama, 4,000 lbs.	288
Hong Kong, 7½ c.	44
Melbourne, 275 gls.	32
Stettin, 1,019 gls.	161
Melbourne, 35 drms.	£200

Chlorate of Potash—

New York, 150 c.	£300
Bilbao, 2	4
Hio, 300 kegs	600
Gothenburg, 5 c.	11
" 5	11
Sydney, 40	93

Chlorate of Lime—

Cape Town, 1 c.	£16
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Chemicals (otherwise undescribed)

Rotterdam, 2 cks.	£17
Aden, 2	10
Madras, 23 pkgs.	280
Canton, 302	1,040
Yokohama, 1,040	1,040
Hio, 10 cs.	126
Calcutta, 6	72
Adelaide, 20 kgs.	136
Yokohama, 40 cs.	246
Sydney, 1	60
Las Palmas, 1 pkg.	13
Auckland, 5 c.	50
Oporto, 13 pkgs.	90
Melbourne, 15	30
Hio, 50 kgs.	98
" 2 cs.	26
Guatemala, 2	18
La Libertad, 4	32
Dominica, 1 pkg.	11
Demerara, 9 pkgs.	14
Madras, 20 cks.	43
Madras, 97 cwts.	351
Sydney, 14 pkgs.	37
" 2	70
Yokohama, 2 cs.	43
Libau, 3	25
Brisbane, 8 pkgs.	65
Greytown, 3	12
Calcutta, 7 drms.	28
Wellington, 25 pkgs.	13
Singapore, 2	25
Kurrachee, 12 cs.	35
Yokohama, 12	146
Grenada, 8 pkgs.	44
Adelaide, 17	87
" 3 cs.	28
Rockhampton, 3 cks.	23

Brisbane, 3 pkgs.	20
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" 10	75
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Mauritius, 5 cs.	47
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Copperas—

Cassablanca, 8 t. 13 c.	£122
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Cream Tartar—

Cape, 224 lbs.	£11
Auckland, 15	87
Melbourne, 10	56
" 20	107
" 16	52

Sydney, 1 t.

Natal, 1 t.	112
Sydney, 1	113
Dunedin, 10 c.	73
" 10	73
Melbourne, 40	222
E. London, 2	14

Citric Acid—

Cologne, 10 cwts.	£74
Genoa, 20	146
Hamburg, 5	35
Bremerhaven, 2,240 lbs.	145
Cape Town, 6	44
Bremen, 5	36
Lisbon, 4	28
Trinidad, ½ c.	5
Natal, 2	16
Dunedin, 5	37
Brussels, 5	35
Libau, 1	140
Reval, 5	37
Singapore, 1	7
Calcutta, 28	36
Hamburg, 210	36
Sydney, 5	36
Hamburg, 2 kegs	15
" 1	8
Bilbao, 2 c.	13
Leghorn, 3 kegs	20
Genoa, 2	7
Natal, 2	16
Reval, 20	146
Naples, 1 t.	120
Hamburg, 20 cks.	154
" 7 c.	50
Sydney, 5	34
B. Ayres, 8	64
Genoa, 10	70
Libau, 350	350

Disinfectants—

Hamburg, 200 gls.	£30
Penang, 200	27
Singapore, 200	27
Calcutta, 15 c.	5
Hamburg, 5 cks.	30
" 30	66
Calcutta, 30	66
Sydney, 2 t.	1

Drysaltery—

Amsterdam, 1	75
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Flowers of Sulphur—

East London, 1	7 c.
Algoa Bay, 5 t.	
E. London, 5 t.	

Gas House Refuse—

New York, 65 t.	2 c.
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Hydro Carbon—

Brazil, 2 t. 10 c.	
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Hydrochloric Acid—

Oporto, 150 gls.	
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Liquid Albumen—

Melbourne, 1	
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Muriate of Lime—

B. Ayres, 52 cwt.	
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Manure—

Hamburg, 97 t. 12 cwts.	
Rouen, 49	3
Jersey, 72	10
Harlingen, 35	10
Jersey, 140	4
Hamburg, 100	10
Melbourne, 10	10
Jersey, 2	154 t. 10 c.
Bordeaux, 2	2,001 200
St. Lucia, 7	13
Dominica, 371	1½
Jersey, 26	5
Trinidad, 10	3
Demerara, 50	
Jersey, 103	
Bordeaux, 260	
Guadeloupe, 100	2
St. Lucia, 103	
Havre, 23	
Rouen, 15	
Jersey, 67	
Trinidad, 10	8
Denia, 3	
Malaga, 16	

Muriate Ammonia—

Gothenburg, 11 cwt.	
Sydney, 2 t. 10	
Auckland, 6 cks.	
Sydney, 2	39 c.
" 20	

Muriate of Potash—

Jersey, 1 t.	124 c.
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Neutralized Borax—

Hamburg, 3 c.	
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Nitrate of Silver—

Hong Kong, 150 ozs.	
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Oxide of Zinc—

Sydney, 2 t.	
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Pyragallic Acid — Yokohama, 10 cwt. £75	Silicate Soda — Barcelona, 20 t. 3 c. £103	Acetic Acid — Lisbon, 7 cks. £30	Sydney, Santander, Seville, Santiago de C, Tarragona, Toronto, Venice, Valencia, Valparaiso, Wellington, Yokohama,
Phosphorous — Melbourne, 4½ c. £60	Soda Acetate — Sydney, 25 c. £42	Antimony — Odessa, 1 t. 0 c. 1 q. £85	Bleaching Powder — Alexandria, 20 kegs.
Wellington, 51	Superphosphate — Cherbourg, 165 t. £495	Ancona, 242 cks.	Antwerp, 11
Otago, 52	Sulphuric Ether — Melbourne, 1,400 lbs. £68	Baltimore, 158	Barcelona, 72
Port Chalmers, 100	Sulphate of Soda — Ghent, 64 t. £64	Batoum, 50 brls.	Bombay, 10 cs.
Potassium Ferrocyanide — New York, 280 lbs. £11	Tartaric Acid — Cape, 1 cwt. £10	Boston, 263 cks.	Bremerhaven, 3
Potash Crystals — Melbourne, 20 c. £100	Bilbao, 2	Bombay, 5 cs.	Callao, 7 cs. 3 cks.
Potassium Chloras — Hong Kong, 30 c. £67	Melbourne, 11	Chicago, 27	Copenhagen, 29
Prussiate of Potash — Cordova, 2 cwt. £11	Sydney, 35	Calcutta, 145 cs.	Dunedin, 13 brls.
Copenhagen, 5½	Dunedin, 5	Genoa, 330 611 cks.	Ghent, 55
Raspberry Acid — Melbourne, £27	Melbourne, 10	Havana, 4	Leghorn, 12
Saltpetre — Adelaide, 1 t. £22	B. Ayres, 8 c. 274	Lisbon, 4	Naples, 18
Auckland, 10 cwt. 11	White Arsenic — Wellington, 2 t. £31	New York, 10 bxs. 96 brls. 288 cks. 81 tcs.	Oporto, 35 brls.
Santos, 139		Malaga, 10 kegs.	Philadelphia, 164 cks.
Rio Janeiro, 39		Rouen, 229	San Francisco, 139 brls. 88 cks.
Adelaide, 18		San Sebastian, 76 cks.	Santander, 25 brls.
Santos, 299 c. 332		Terneuzen, 25 cks.	Trieste, 4
Melbourne, 179		Bone Waste — Rouen, 12 t. 2 c. £96	
Dunedin, 50		" 250 bgs. 160	
Sydney, 20		Borax — Rotterdam, 5 t. 2 c. 3 q. £143	
Salammoniac — Marseilles, 66 t. £785		Antwerp, 5	
Shanghai, 18 c. 32		New York, 16 2	
Hamburg, 40		Rouen, 34 4	
Sulphate Alumina — Bordeaux, 100 c. £20		Havana, 1 13 2	
		Nantes, 5 6	
Sulphate of Ammonia — Hamburg, 150 t. £1,763		Brimstone — Havana, 1 t. 6 c. £9	
Cologne, 100 t. 1,219 c. 725		Calcutta, 16 t. 5 c. 2 q. 76	
Ghent, 30		Maccio, 13 2 q. 6	
Cherbourg, 20		Boric Acid — Bordeaux, 10 t. £300	
Hamburg, 1,020 c. 605		Bremerhaven, 2 13 c. 3 q. 75	
Demerara, 97		Genoa, 1 2 2 40	
Genoa, 200		Halifax, 3 3 7	
Demerara, 10 6		Caustic Soda — Amsterdam, 143 dms.	
Hamburg, 50 11		Algoa Bay, 20 bxs.	
Demerara, 5 19		Antwerp, 73 dms.	
		Alexandria, 52	
Sulphate of Copper — Trepot, 145 c. £165		Alicante, 7	
Rouen, 264		Barcelona, 25 brls.	
Salonica, 23 cwt. 27		Bombay, 69 cks. 50 bxs. 224 drs.	
Adelaide, 5 t. 120		Batoum, 208 dms.	
Odrssa, 203		Bari, 50	
Antwerp, 33		Boston, 1,525 10 brls.	
Colombo, 12		Brisbane, 20	
Bordeaux, 9 19		Calcutta, 179	
Oporto, 5 15		Catania, 5	
Dunedin, 25		Corfu, 40	
Barcelona, 198		Canada, 10	
		Chicago, 90	
Sheep Dip — Falkland, 1 c. £50		Dunedin, 20	
Elizabeth Isld. 13		East London, 24 bxs.	
Cazy Bay, 1 t. 16		Fiume, 50	
Dinero, 18		Genoa, 445	
Dunedin, 2,300 gms. 299		Havana, 70	
Melbourne, £143		Hiogo, 500	
B. Ayres, 80 gl. 30		Kobe, 50	
Algoa Bay, 12 4 c. 24		La Guayra, 50	
Natal, 10 cs. 24		Leghorn, 68	
" 10 280		Marseilles, 80	
Calcutta, 310 drms. 5 cks. 221		Malta, 85	
Natal, 19		Maceio, 80	
Hobart, 9,760 gls. 1,196		Malmo, 4	
E. London, 200 40		Manila, 150	
Algoa Bay, 7,000 c. 203		Monte Video, 150 50 cs.	
Melbourne, £90		Nagasaki, 200	
Strychnine — Sydney, 200 ozs. £84		Nantes, 18	
Sulphate de Baryte — Leghorn, £75		New York, 2,230 177 cks. 10 bxs.	
Sulphuric Acid — Aden, 120 gms. £15		Oporto, 80	
Natal, 4 t. 4 c. 30		Penang, 100	
" 5 5		Philadelphia, 445 135	
Zanzibar, 80 gls. 15		Pernambuco, 30	
Singapore, 1		Portland M. 235 23 cks.	
P. Elizabeth, 3		Piramus, 30	
" 8 t. 15		Port Natal, 59 cs.	
Natal, 116 lbs. 40		Puerto Cabello, 10	
" 1,008		Rio Janeiro, 4	
" 76 c. 16		Rosario, 10	
Salammoniac — Aden, 1 t. 1 cwt. £35		Rotterdam, 130	
Antwerp, 40		Rouen, 20	
Bagdad, 21		Rio Grande do Sul, 68 dms.	
Salonica, 21		San Francisco, 200	
Berice, 5		San Sebastian, 60	
Rosario, 6			
Hamburg, 60 10			
Lisbon, 1 15			

LIVERPOOL.

The period Jan. 24th—Feb. 8th.

Alkali — Ancona, 10 cks.	Alum Cake — Calcutta, 12 t. 13 c. 2 q. £51	Bone Waste — Rouen, 12 t. 2 c. £96	Copperas — Bahia, 5
Batoum, 40 tcs.	Sydney, 5 4 3	" 250 bgs. 160	Beyrout, 3
Boston, 70 brls.	Montreal, 22 14 2	Borax — Rotterdam, 5 t. 2 c. 3 q. £143	Calcutta, 23
Leghorn, 3 tcs.	New York, 5 t. 14 c. £127	Antwerp, 5	Piræus, 3
New York, 294	Manila, 6	New York, 16 2	Kurrachee, 3
Ammonium Muriate — Buenos Ayres, 4 cs. £16	Bilbao, 4 17	Rouen, 34 4	Alexandria, 6
Santander, 20 kgs. £34	Melbourne, 12 1 q. 13	Havana, 1 13 2	Madras, 7
Genoa, 15	Ammonium Carbonate — Buenos Ayres, 4 cs. £16	Nantes, 5 6	Alexandria, 4
Genoa, 1 t. 10 c. 63	Santander, 20 kgs. £34	Brimstone — Havana, 1 t. 6 c. £9	Madras, 6
Genoa, 3 1	Genoa, 1 t. 10 c. 63	Calcutta, 16 t. 5 c. 2 q. 76	
Madrid, 4	Genoa, 9½ cwt. 16	Maccio, 13 2 q. 6	Carbolic Solid — Genoa, 1
Acids —(otherwise undescribed) Vera Cruz, 1 ck. 3 cs. £42	Ammonia Sulphate — Ghent, 50 t. 5 c. £603	Boric Acid — Bordeaux, 10 t. £300	Cadiz, 13
Ammonia Sulphate — Bordeaux, 48 2 q. 822	Bordeaux, 133 bgs. 156	Bremerhaven, 2 13 c. 3 q. 75	Oporto, 5
Gr. Canary, 15 6 1	Demerara, 226 cks. 797	Genoa, 1 2 2 40	Patras, 2
Bordeaux, 55 7 c. 690	Hamburg, 403 bgs. 492	Halifax, 3 3 7	Alexandria, 10
Bordeaux, 20 6 3	Valencia, 55 7 c. 690	Caustic Soda — Amsterdam, 143 dms.	Calcutta, 2
Gr. Canary, 26	Bordeaux, 20 6 3	Algoa Bay, 20 bxs.	Syria, 2
Ancona, 20	Gr. Canary, 26	Antwerp, 73 dms.	Calcutta, 2
Valencia, 81 10 2	Ancona, 20	Alexandria, 52	Calcutta, 2
Talcahuana, 4 12 3	Valencia, 81 10 2	Alicante, 7	Syria, 2
Gr. Canary, 6 3	Talcahuana, 4 12 3	Barcelona, 25 brls.	Calcutta, 2
Rouen, 5	Gr. Canary, 6 3	Bombay, 69 cks. 50 bxs. 224 drs.	Calcutta, 2
Alum — New York, 15 t 15 c £80	Rouen, 5	Batoum, 208 dms.	Calcutta, 2
Bombay, 17 7	Alum — New York, 15 t 15 c £80	Bari, 50	Calcutta, 2
Portland M. 3 0 1 q. 15	Bombay, 17 7	Boston, 1,525 10 brls.	Calcutta, 2
Alexandria, 4 1	Portland M. 3 0 1 q. 15	Brisbane, 20	Calcutta, 2
Lisbon, 1	Alexandria, 4 1	Calcutta, 179	Calcutta, 2
Madras, 3	Lisbon, 1	Catania, 5	Calcutta, 2
Natal, 2 2	Madras, 3	Corfu, 40	Calcutta, 2
Valparaiso, 1	Natal, 2 2	Canada, 10	Calcutta, 2
Patras, 10 cks. 7	Valparaiso, 1	Chicago, 90	Calcutta, 2
Sydney, 61	Patras, 10 cks. 7	Dunedin, 20	Calcutta, 2
Sulphuric Acid — Aden, 120 gms. £15	Sydney, 61	East London, 24 bxs.	Calcutta, 2
Natal, 4 t. 4 c. 30	Sulphuric Acid — Aden, 120 gms. £15	Fiume, 50	Calcutta, 2
" 5 5	Natal, 4 t. 4 c. 30	Genoa, 445	Calcutta, 2
Zanzibar, 80 gls. 15	" 5 5	Havana, 70	Calcutta, 2
Singapore, 1	Zanzibar, 80 gls. 15	Hiogo, 500	Calcutta, 2
P. Elizabeth, 3	Singapore, 1	Kobe, 50	Calcutta, 2
" 8 t. 15	P. Elizabeth, 3	La Guayra, 50	Calcutta, 2
Natal, 116 lbs. 40	" 8 t. 15	Leghorn, 68	Calcutta, 2
" 1,008	Natal, 116 lbs. 40	Marseilles, 80	Calcutta, 2
" 76 c. 16	" 1,008	Malta, 85	Calcutta, 2
Salammoniac — Aden, 1 t. 1 cwt. £35	" 76 c. 16	Maceio, 80	Calcutta, 2
Antwerp, 40	Salammoniac — Aden, 1 t. 1 cwt. £35	Malmo, 4	Calcutta, 2
Bagdad, 21	Antwerp, 40	Manila, 150	Calcutta, 2
Salonica, 21	Bagdad, 21	Monte Video, 150 50 cs.	Calcutta, 2
Berice, 5	Salonica, 21	Nagasaki, 200	Calcutta, 2
Rosario, 6	Berice, 5	Nantes, 18	Calcutta, 2
Hamburg, 60 10	Rosario, 6	New York, 2,230 177 cks. 10 bxs.	Calcutta, 2
Lisbon, 1 15	Hamburg, 60 10	Oporto, 80	Calcutta, 2
	Lisbon, 1 15	Penang, 100	Calcutta, 2
		Philadelphia, 445 135	Calcutta, 2
		Pernambuco, 30	Calcutta, 2
		Portland M. 235 23 cks.	Calcutta, 2
		Piramus, 30	Calcutta, 2
		Port Natal, 59 cs.	Calcutta, 2
		Puerto Cabello, 10	Calcutta, 2
		Rio Janeiro, 4	Calcutta, 2
		Rosario, 10	Calcutta, 2
		Rotterdam, 130	Calcutta, 2
		Rouen, 20	Calcutta, 2
		Rio Grande do Sul, 68 dms.	Calcutta, 2
		San Francisco, 200	Calcutta, 2
		San Sebastian, 60	Calcutta, 2

Bordeaux, 15 t.	3 c.	2 q.	356
Dunkirk, 5	0	2	120
Iquique, 19	19	1	470
Barcelona, 5	2	2	115
Bari, 1	2	0	30
Bilbao, 9	17	3	185
Genoa, 13	17	3	234
"	15	3	333
Nantes, 78	6	3	1,896
"	24	11	788
Adelaide, 10			299
Venice, 3	1	1	55
Havre, 5			109
Bordeaux, 64	10		1,358
Genoa, 8		3	186
Fiume, 4	17		110
Nantes, 9	18	1	230
Venice, 25	7	3	379
Sydney, 74			530
Tarragona, 5	1		98
Rosario, 3			63
Barcelona, 19	19	2	430
H. Ayres, 6			135
Passages, 136 cks.			448
Constantinople, 7 brls.			18
Lima, 4			6
Carril, 4			20
Barcelona, 5			26
Passages, 82			387
Barcelona, 105 cks.			453
Bordeaux, 331 brls. 161 ck.			2,652
Havre, 21 cks.			120
Chloride of Lime—			
Callao, 13 c.			£6
New York, 99 t. 5 c.			550
Chloride—			
Trinidad, 1 t. 6 c. 3 q.			£68
Chemicals (otherwise undescribed)			
Porto Alegre, 7 c. 3 q.			£15
Boston, 10 cks.			156
Vera Cruz, 11 brls.			50
Acajutla, 4 cks.			17
Havre, 116			1,147
Monte Video, 1 csk.			8
Cream Tartar—			
St. John, N.B., 10 c. 1 q.			£52
Disinfectants—			
Bombay, 2 t. 17 c.			£21
Canada, 32 cks.			76
Disinfectant Powder—			
Para, 2 cks.			8
Bombay, 50 cks.			13
Bombay, 5 t.			39
New York, 5 cks.			45
Dried Blood—			
Bordeaux, 21 t. 3 c.			£180
Epsom Salts—			
Bombay, 100 kgs.			
Calcutta, 100			
Mauritius, 5			
Glycerine—			
Philadelphia, 9 t.			£240
Gypsum—			
New York, 9 t. 2 c.			£27
Guano—			
Valencia, 3,387 bgs.			£2,594
Iron Chromate—			
Gothenburg, 1 t.			£11
Iron Oxide—			
Eurena, 150 cks.			£93
Antwerp, 10 t.			8
Philadelphia, 22 13 c.			465
Magnesia—			
Carril, 1 c.			
Havre, 30			
Rio Janeiro, 1,160			
Santos, 20			
Trieste, 1			
Magnesium Chloride—			
Bombay, 5 t. 3 c.			£14
Rouen, 10 9			223
Manure—			
Marseilles, 752 bgs. 223 brls.			£481
Gr. Canary, 48 t. 44 c.			496
Malaga, 5 10			713
Genoa, 197 1 q.			482
Havre, 118 4 2			
Nitric Acid—			
Callao, 1 csk.			£22
Oxalic Acid—			
Ghent, 2 t. 2 c.			£78
Genoa, 1 csk.			7
Barcelona, 13 11 11			21
Pitch—			
Bilbao, 4 t.			
Cette, 1,150			
London, 20 brls.			
Carbonate—			
65 t. 5 c.			£330
1 t. 17 c.			£54
Boston, 8 34			127
New York, 13 13			144
Potashes—			
Rosario, 2 dms.			£5
Buenos Ayres, 1 t. 19 c. 1 q.			23
Palermo, 6			127
Potassium Bichromate—			
Salonica, 11 c. 2 q.			£19
Alexandria, 10			16
Havana, 5			19
Alexandria, 9			15
Smyrna, 9 3			17
Odessa, 1 t. 3			39
Venice, 9 3			17
New York, 11 t.			325
Calcutta, 3 c.			59
Marseilles, 6 cks.			30
Potassium Chlorate—			
New York, 2 t. 15 c.			£415
Havana, 2 10			116
Rotterdam, 10			21
Barcelona, 3			126
Rotterdam, 10			27
New York, 5			304
Hamburg, 1			47
Hamburg, 15 6			693
New York, 13 15			641
Kobe, 6 11			390
Yokohama, 5			198
Genoa, 1			44
Portland M., 10			10
Leghorn, 15			35
Shanghai, 3 10			166
Valencia, 1 10			51
Antwerp, 7			359
Barcelona, 1			51
Hamburg, 5 10 3 q.			140
Shanghai, 10			20
Hio, 5			910
Potassium Chromate—			
Genoa, 2 t. 13 c.			£75
Potassium Iodide—			
Carril, 1 c.			£11
Phosphorus—			
Buenos Ayres, 10 cks.			£220
Potassium Stannate—			
Bombay, 2 cks.			£40
Potassium Chloride—			
Hamburg, 44 pkgs.			£93
Gothenburg, 140 kgs.			£296
Hio, 150			£300
Genoa, 20			£40
Potash Salts—			
Portland (Maine) 2 t. 1 c.			£60
Salt—			
Antwerp, 655 t.			
Algoa Bay, 9			
Bombay, 2			
Boston, 719			
Baltimore, 145			
Barbadoes, 42			
Calcutta, 690			
Conakry, 25			
Chicago, 230			
Chittagong, 3,273			
E. London, 13 t.			
Grand Bassa, 7			
Galveston, 569			
Ghent, 180			
Georges Bay, 9			
Lagos, 20			
Malta, 5			
Marstrand, 55			
Newcastle, 200			
New Orleans, 4,244			
Norfolk, 1,100			
Old Calabar, 102			
Opobo, 317			
Para, 35			
Pensacola, 500			
Rangoon, 1,642			
Rio Grande do Sul, 1 t. 100 cs.			
Rotterdam, 289			
Rouen, 10			
Sandheads, 6,786			
San Francisco, 70			
Savannah, 262			
Talcahuano, 100			
Valparaiso, 3			
Wellington, 70			
Soda Crystals—			
Boston, 280 cks.			500 kgs. 654 brls.
Bombay, 550			
Calcutta, 50			
Halifax, 50			
Kurrachee, 25			
Malta, 50			
Malaga, 10 cks.			
Otago, 14			
Philadelphia, 60			
Smyrna, 30			150
Valparaiso, 20			10
Sodium Silicate—			
Alicante, 14 cks.			144
Alexandria, 10			264
Bombay, 10			
Smyrna, 40			35 brls.
Seville, 32			
Venice, 19			
Yokohama, 19			
Sodium Carbonate—			
Boston, 168 dms.			168 brls.
Calcutta, 24			
Hamburg, 17			5 bxs.
Melbourne, 421			
New York, 10			
Sydney, 10			
Soda Ash—			
Adelaide, 40 brls.			
Baltimore, 735 cks. 818 tcs.			
Barcelona, 30			40
Bombay, 4			
Boston, 473			393 1,360 bgs.
B. Ayres, 200			200 brls.
Canada, 10			
Dundas, 17			
Dunedin, 30			
Ghent, 41			
Kingsley, 14			
Hamilton, 90			
Lisbon, 10			135
Macao, 50			
Malaga, 12			
Maranham, 175			
Melbourne, 82			
M. Video, 35			
New Glasgow, 20			
New York, 946			137
Oporto, 66			10 pps.
Patras, 30 brls.			
Philadelphia, 589 cks. 769			
Puerto Cabello, 12			
Porto Alegre, 100			
Rangoon, 8			
Rio Janeiro, 100			
Rosario, 100			
Rithymo, 100			
Sherbrooke, 47			
Sydney, 235			
Smyrna, 76			
San Francisco, 17 cks.			
Trieste, 36			
Valparaiso, 50			
Venice, 15			
Wellington, 98			40
Sodium Bicarbonate—			
Adelaide, 65 kegs			
Amsterdam, 15 cks			
Ancona, 20 kegs			
Bombay, 125			
Buenos Ayres, 100			
Calcutta, 200			
Copenhagen, 6 cks.			
Dunedin, 90 kegs			
Genoa, 20 cks.			
Halifax, 25 brls.			150 kegs
Hamburg, 45 kegs			
Kurrachee, 50			
Melbourne, 274			
Matanzas, 10 kegs			1 cs.
Marseilles, 40			
Malaga, 50			
Nagasaki, 200			
Nantes, 10 cks.			
Naples, 40 kegs			
Napier, 20			
Rangoon, 50			
Rotterdam, 125 kegs			9 cks.
Rouen, 115			
Sydney, 270			
Valparaiso, 50			
Wellington, 50			
Yokohama, 2,000			
Sugar and Lead—			
Havana, 4 c. 1 q.			£5
Sulphuric Acid—			
Monte Video, 1 t. 10 c.			£18
Sodium Biborate—			
Hamburg, 5 t. 7 c. 2 q.			£161
Rotterdam, 19 3			9
Santos, 6			
Antwerp, 14 10 3			436
Dunkirk, 5			150
Boston, 2 6 1			70
Yokohama, 3 11 2			166
New York, 13 cks.			65
Sheep Dip—			
Natal, 8 c. 3 q.			£22
Algoa Bay, 17 3			55
Cape Town, 2 t. 4			100
Buenos Ayres, 14 t. 16 c.			£237
Buenos Ayres, 400 dms. 100 cks.			750
"			180
Sodium Sulphate—			
Wellington, 2 t. 1 c.			£15
Superphosphate—			
Hamburg, 100 t. 1 c. 1 q.			£350
Sulphur—			
Boston, 50 t. 2 c.			
Calcutta, 14			
Wellington, 1			
Madras, 3 18 1 q.			
Calcutta, 7 10			
St. John's, N.B., 1 t. 16 c. 1 q.			
Macao, 30			
New York, 50			
Boston, 344 bgs.			
New York, 185			62 brls.
Havana, 100			
Wellington, 14 kgs.			
Callao, 101 bgs.			
Iquique, 33			67
Boston, 335			
Sodium Bichromate—			
Piraeus, 4 t. 19 c. 3 q.			
Boston, 17 t.			
Oporto, 13 c.			
Saltcake—			
Philadelphia, 100 t. 7 c.			
New York, 25 t. 5 c.			
Philadelphia, 48 t. 18 c.			
Boston, 71 cs. 62 cks.			
Bremen, 17 brls.			
Baltimore, 121 cks.			
Sheep Wash—			
Buenos Ayres, 11 t. 9 c. 1 q.			
Salammoniac—			
Smyrna, 1 t. 16 c. 1 q.			
Alexandria, 4 6 2			
Genoa, 17 2			
Piraeus, 3			
Marseilles, 1			
Mersyne, 3 3 1			
New York, 1 18 2			
Samsolin, 7 3			
Calcutta, 3 19 3			
Amsterdam, 5 3			
Santander, 5			
Vera Cruz, 18			
New York, 4 16			
Alexandria, 2 1			
Marseilles, 10 brls.			
Antwerp, 1 ck.			
Naples, 4			
Marseilles, 37			
Calcutta, 35			
Genoa, 7			
New York, 15			
B. Ayres, 23			
Patras, 1 csk.			
Philadelphia, 2			
"			51
Smyrna, 10 brls.			
Sydney, 5			
Santander, 1 t. 10 c.			
Sodium Nitrate—			
Almeria, 1 t. 17 c. 3 q.			
Shanghai, 5 2			
Fiume, 6 7 2			
Bilbao, 5 1 1			
Copenhagen, 3 13 3			
Malaga, 6 7 1			
Las Palmas, 19 19			
Lisbon, 49 13 3			
Rio de Janeiro, 5 t.			
Carthagena, 10 1 1			
Almeria, 6 8 2			
Malaga, 6 6 3			
Sodium Sulphate—			

Zinc Oxide—	
Bilbao, 3 c. 3 q.	£5
Cephalonia, 12	14
Zinc Chloride—	
Piraeus, 10 c. 1 q.	£10
Rouen, 1 t. 7 c.	21
Boston, 1 t. 17 c. 3 q.	13
Marseilles, 2 cks.	£11
Zinc Muriate—	
Bombay, 6 t.	£42

GLASGOW.*The period, Jan. 24th—Feb. 8th.*

Alum—	
Lisbon, 5 t. 6½ cwt.	£24
Asbestos—	
Bombay, 14 cwt.	£37
Bilbao, 5½	63
Benzol—	
Dieppe, 94 puns.	£920
Rotterdam, 25	290
" 9 drums.	230
British Gum—	
Lisbon, 35 cwt.	£41
Blood Albumen—	
Lisbon, 1	£34
Cement—	
Jamaica, 209½ cwt.	£22. 135.
Copperas—	
Bombay, 36 t. 19 cwt.	£109
Copper Sulphate—	
Italy, 5 t. 6 cwt.	£98
Palermo, 5 4½	105
Bilbao, 11 4½	183
Chemicals (otherwise undescribed)	
Bombay, 5 t. 15½ cwt.	£65
Rangoon, 9 16	67
Dyestuffs—	
Logwood Extracts	
Halifax, 1	£129
Aniline	
Melbourne, 1	£5
Logwood	
Melbourne, 15 t.	£146
Dyewood Liquor	
Lisbon, 6 t. 14½ cwt. £33. 98.	
Dyestuffs (otherwise undescribed)	
Lisbon, 16 t. 7 cwt.	£345
Tannin	
Lisbon, 3 cwt.	£20
Dye-Colours	
Calcutta, 1½ cwt.	£31
Alizarine	
Bombay, 2 t. 8½ cwt.	£173
Lisbon, 55	£24
Aniline	
Oporto, 17 cwt.	£60
Epsom Salts—	
Christiania, 5 tons.	£34
Farina—	
Rouen, 5 t.	£50
Iron Liquor—	
Lisbon, 1	£43. 108.
Litharge—	
Bombay, 1 t. 14½ c.	£28
Naphtha—	
Rouen, 1	£130
Ochre—	
Calcutta, 105½ cwt.	£35
Potassium Prussiate—	
Italy, 2 t. 10½ cwt.	£100
Rouen, 5 t. 7½ cwt.	£366
Potassium Bichromate—	
Antwerp, 114½ cwt.	£195
Christiania, 4 cks.	51
Bombay, 1½ tons	62
Rotterdam, 22 cks.	215
Italy, 234½ cwt.	440
" 11 tons 13 cwt.	363
Antwerp, 60 cwt.	110
Rotterdam, 15 cks.	218
Calcutta, 1½ cwt. 4 lbs.	21
Rouen, 8 tons 14½ cwt.	944
Amsterdam, 4 cks.	170
Pitch—	
Peru, 60 t. 14½ cwt.	£685
Palermo, 33 12½	65
Calcutta, 1	£33. 108.
Bombay, 1	46 108.
Dieppe, 640	
Paraffin Wax—	
Natal, 7,126 brls.	£100
Italy, 403 cwt.	535
Antwerp, 158	213
Lisbon, 11½	16
Bilbao, 30 t. 10½ cwt.	757
Rouen, 4 6½	105

Red Lead—	
Bombay, 1	£106
Melbourne, 30 cwt.	£29 158
Rosin—	
Bombay, 20 t. 8½ cwt.	£96
" 6 9	£43. 115.
" 85	408
Sugar of Lead (Brown)—	
Bombay, 4 t. 7½ cwt.	78
Sulphate of Ammonia—	
Antwerp, 20 t.	£243
Valencia, 55 t. 1 cwt.	612
Antwerp, 10	121
Sodium Bichromate—	
Rotterdam, 4 cks.	£28
Italy, 641½ cwt.	897
Antwerp, 148½	240
Rouen, 22 t. 17½ cwt.	478
Sulphuric Acid—	
Calcutta, 14 t. 18½ cwt.	£65
Bombay, 1	143
" 6 7	£36. 158.
Rangoon, 12 8½	£52. 108.
Bombay, 135	
Soap—	
Jamaica, 628 cwt.	£511
Halifax, 1	447
Colombo, 24	23
Sodium Nitrate—	
Singapore, 28 t. 15½ c.	£244
Salammoniac—	
Melbourne, 2 t. 5½ cwt.	£74
Sulphur—	
Halifax, 30 cwt.	£14
Tar—	
Madras, 15 t. 6 cwt.	£40
Bombay, 1	94
" 121. 108.	
Varnish—	
Natal, 3½ cwt.	£22
Wood Pulp—	
Melbourne, 10 t. 2 cwt.	£150
White Lead—	
Bombay, 1	£127
" 8 t. 18½ cwt.	133
" 17	170
Calcutta, 1	103
Melbourne, 842	444

TYNE.*The period, Jan. 23rd—Feb. 7th.*

Arsenic—	
Copenhagen, 5 t. 13 c.	
Gothenburg, 1 11	
Venice, 3 3	
Ammonium Sulphate—	
Odense, 5 t.	
Hamburg, 50	
Antimony—	
New York, 30 t.	
Rouen, 2 2 c.	
Helsingborg, 6	
Alkali—	
New York, 250 t. 6 c.	
Rotterdam, 15 9	
Antwerp, 22 12	
Christiania, 15 18	
Amsterdam, 45 145	
Genoa, 8 4	
Barytes Nitrate—	
Rouen, 5 t. 1 c.	
Antwerp, 7	
Barytes—	
Rouen, 25 t.	
Copenhagen, 2	
Barytes Chlorate—	
Hamburg, 8 c.	
Barytes Carbonate—	
Rouen, 20 t.	
New York, 50	
Venice, 5	
Bleaching Powder—	
New York, 277 t. 2 c.	
Boston, 33 12	
Copenhagen, 132 9	
Libau, 165 14	
Rouen, 19 15	
Rotterdam, 60 8	
Bilbao, 10 19	
Antwerp, 142 14	
Malmö, 9 18	
Hamburg, 63 18	
Dunkirk, 20 7	
Christiania, 15 2	
Gothenburg, 15 14	
New York, 257 6	
Amsterdam, 35 11	
Genoa, 20 9	
Venice, 2 18	
Copperas—	
Copenhagen, 4 t.	

Caustic Soda—	
New York, 175 t. 11 c.	
Rouen, 13 13	
Antwerp, 22 1	
Gothenburg, 30 5	
Copenhagen, 10 11	
Bilbao, 6 2	
Libau, 30 2	
Hamburg, 28 17	
Dyestuffs—	
Alizarine	
New York, 8 t. 4 c.	
Ferro Manganese—	
Bilbao, 35 t.	
Gypsum—	
New York, 108 t. 16 c.	
Litharge—	
Copenhagen, 1 t. 7 c.	
Antwerp, 3 2	
Gothenburg, 10 2	
New York, 5 6	
Magnesia—	
New York, 3 t. 2 c.	
Antwerp, 1	
Hamburg, 3	
Naphthaline—	
Copenhagen, 25 t.	
Oxalic Acid—	
New York, 11 t.	
Pitch—	
Antwerp, 240 t.	
Potassium Bichromate—	
Bergen, 14 c.	
Phosphorus—	
Malmö, 9 c.	
Potassium Chlorate—	
Rotterdam, 1 t. 8 c.	
Antwerp, 4 13	
Superphosphate—	
Cherbourg, 135 t.	
Genoa, 498 10 c.	
Venice, 800 1	
Sodium Sulphate—	
New York, 31 t. 3 c.	
Rotterdam, 10 2	
Copenhagen, 5 5	
Soda—	
New York, 105 t. 14 c.	
Rotterdam, 39 7	
Esbjerg, 6	
Odense, 6	
Aarhus, 13 19	
Copenhagen, 25 1	
Svendborg, 10 19	
Genoa, 8 4	
Venice, 26 10	
Gothenburg, 5	
Soda Ash—	
Gothenburg, 10 c. 7 c.	
Odense, 3 5	
Hamburg, 2 12	
Christiania, 11 18	
New York, 61 8	
Antwerp, 13 19	
Genoa, 42 19	
Venice, 41 9	
Sodium Bicarbonate—	
Genoa, 5 c.	
Sodium Chlorate—	
Antwerp, 11 c.	
Hamburg, 2 t. 22	
Sodium Hyposulphite—	
Amsterdam, 5 t. 11 c.	

HULL.*The period, Jan. 22nd—Feb. 7th.*

Alkali—	
Marseilles, 185 drums.	
Rotterdam, 2 cases, 6 casks.	
Bleaching Powder—	
Bordeaux, 15 casks	
Christiania, 19	
Gothenburg, 11	
Caustic Soda—	
Antwerp, 11 drums.	
Bergen, 2	
Christiania, 6	
Danzig, 18	
Chemicals (otherwise undescribed)	
Antwerp, 4 cs. 1 ck. 36 pkgs. 337 drs.	
Bordeaux, 20	
Bergen, 27	
Copenhagen, 2 1 case	
Christiania, 4 cks. 20 pkgs.	
Danzig, 15 72	
Genoa, 16 56 cs.	
Ghent, 2	
Gothenburg, 40 24 5	
Hamburg, 34 95 59	
Königsberg, 21	
Libau, 24	

Marseilles, 1	
Naples, 1	
New York, 10	
Rotterdam, 10	
Reval, 25	
Rouen, 20	
Stettin, 100	
Stavanger, 11	
Dyestuffs—	
Antwerp, 1	
Hamburg, 1	
Rotterdam, 1	
Reval, 4	
Rouen, 1	
Farina—	
Rotterdam, 1	
Glue—	
New York, 13	
Manure—	
Ghent, 276	
Pitch—	
Antwerp, 1	
Dunkirk, 1	
Genoa, 1	
Naples, 1	
Painters' Colors—	
Antwerp, 1	
Bremen, 1	
Bergen, 1	
Copenhagen, 1	
Christiania, 1	
Christiansund, 1	
Dunkirk, 1	
Ghent, 1	
Gothenburg, 1	
Hamburg, 15	
New York, 1	
Rotterdam, 1	
Rouen, 1	
Soap—	
Copenhagen, 1	
Slag—	
Danzig, 279 to	
Tar—	
Christiania, 1	
Hamburg, 1	
Rotterdam, 1	
Varnish—	
Antwerp, 1	
Copenhagen, 2	
Gothenburg, 1	
Hamburg, 1	

GO.*The period, Jan.*

Benzole—	
Antwerp, 72 c	
Ghent, 31 d	
Hamburg, 82 c	
Rotterdam, 73 c	
Terneuzen, 32 d	
Bleaching Po	
Ghent, 25 c	
Rotterdam, 27	
Chemicals (of	
Ghent, 14 c	
Boulogne, 4	
Hamburg, 44	
Coal Products	
Boulogne, 2 c	
Hamburg, 54	
Calais, 31	
Dyestuffs—	
Boulogne, 1 c	
Ghent, 22 c	
Manure—	
Boulogne, 120	
Dunkirk, 165	
Ghent, 184	
Hamburg, 900	
Rotterdam, 218	
Dunkirk, 105	
Pitch—	
Antwerp, 335	
Dunkirk, 470	
GRI	
<i>The period, Jan.</i>	
Coal Products	
Dieppe, 15 cks	
" 77	
Chemicals (of)	
Dieppe, 14	
" 32	
Hamburg, 21	
Rotterdam, 31 2	

PRICES CURRENT.

THURSDAY, FEBRUARY 13, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt	7/6	& 12/6	
" Glacial	"	2	10	0
Arsenic, S.G., 2000	"	0	12	0
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	"	0	0	3¼
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
(Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1¾
Oxalic	nett	0	0	3¾
Picric	"	0	1	5
Sulphuric (fuming 50 %)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (" 150°)	"	1	8	0
" (free from arsenic, 140/145°)	"	1	10	0
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	"	0	1	2¾
Arsenic, white powered	per ton	13	0	0
Alum (looselump)	"	4	12	6
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 880 = 28°	per lb.	0	0	3
" = 24°	"	0	0	1¾
" Carbonate	nett	0	0	3½
" Muriate	per ton	23	15	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/- & 35/-		
" Nitrate	per ton	40	0	0
" Phosphate	per lb.	0	0	10½
" Sulphate (grey), London	per ton	11	18	9
" (grey), Hull	"	11	17	6
Aniline Oil (pure)	per lb.	0	1	0
Aniline Salt	"	0	0	11
Antimony	per ton	75	0	0
" (tartar emetic)	per lb.	0	1	1
" (golden sulphide)	"	0	0	10
Barium Chloride	per ton	7	10	0
" Carbonate (native)	"	3	15	0
" Sulphate (native levigated)	"	45/- to 75/-		
Bleaching Powder, 35 %	"	5	7	6
" Liquor, 7 %	"	2	10	0
Bisulphide of Carbon	"	12	15	0
Chromium Acetate (crystal	per lb.	0	0	6
Calcium Chloride	per ton	2	0	0
China Clay (at Runcorn) in bulk	"	17/6 to 35/-		
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	6
Benzol, 90 % nominal	per gallon	0	3	11
50/90	"	0	3	0
Carbolic Acid (crystallised 35°)	per lb.	0	0	10¼
" (crude 60°)	per gallon	0	2	10
Creosote (ordinary)	"	0	0	2½
" (filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30 % @ 120° C.	"	0	1	3
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	12	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	11
Coke-oven Oils (crude)	"	0	0	2½
Copper (Chili Bars)	per ton	47	0	0
" Sulphate	"	24	10	0
" Oxide (copper scales)	"	52	0	0
Glycerine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	55	0	0
Iodine	nett, per oz.	8d.	to 9d.	
Iron Sulphate (copperas)	per ton	1	10	0
" Sulphide (antimony slag)	"	2	0	0
Lead (sheet) for cash	"	14	15	0
" Litharge Flake (ex ship)	"	17	0	0
" Acetate (white	"	23	5	0
" (brown	"	19	0	0
" Carbonate (white lead) pure	"	19	0	0
" Nitrate	"	22	5	0

		£	s.	d.
Lime, Acetate (brown)	.. .. .	8	7	6
" " (grey)	.. .. .	14	0	0
Magnesium (ribbon and wire)	.. .. .	per ton	0	2
" Chloride (ex ship)	.. .. .	per ton	2	6
" Carbonate	.. .. .	per cwt.	1	17
" Hydrate	.. .. .	"	0	10
" Sulphate (Epsom Salts)	.. .. .	per ton	3	0
Manganese, Sulphate	.. .. .	"	18	0
" Borate (1st and 2nd)	.. .. .	per cwt.	60/-	82/6
" Ore, 70 %	.. .. .	per ton	4	10
Methylated Spirit, 61° O.P.	.. .. .	per gallon	0	2
Naphtha (Wood), Solvent	.. .. .	"	0	3
" Miscible, 60° O.P.	.. .. .	"	0	4
Oils:—				
Cotton-seed	.. .. .	per ton	22	0
Linseed	.. .. .	"	23	0
Lubricating, Scotch, 890°—895°	.. .. .	"	7	5
Petroleum, Russian	.. .. .	per gallon	0	0
" American	.. .. .	"	0	0
Potassium (metal)	.. .. .	per oz.	0	3
" Bichromate	.. .. .	per lb.	0	0
" Carbonate, 90% (ex ship)	.. .. .	per ton	18	5
" Chlorate	.. .. .	per lb.	0	0
" Cyanide, 98%	.. .. .	"	0	2
" Hydrate (Caustic Potash) 80/85 %	.. .. .	per ton	22	10
" " (Caustic Potash) 75/80 %	.. .. .	"	21	10
" " (Caustic Potash) 70/75 %	.. .. .	"	20	15
" Nitrate (refined)	.. .. .	per cwt.	1	3
" Permanganate	.. .. .	"	4	5
" Prussiate Yellow	.. .. .	per lb.	0	0
" Sulphate, 90 %	.. .. .	per ton	9	10
" Muriate, 80 %	.. .. .	"	7	15
Silver (metal)	.. .. .	per oz.	0	3
" Nitrate	.. .. .	"	0	2
Sodium (metal)	.. .. .	per lb.	0	4
" Carb. (refined Soda-ash) 48 %	.. .. .	per ton	5	10
" " (Caustic Soda-ash) 48 %	.. .. .	"	4	7
" " (Carb. Soda-ash) 48 %	.. .. .	"	4	15
" " (Carb. Soda-ash) 58 %	.. .. .	"	5	12
" " (Soda Crystals)	.. .. .	"	2	13
" Acetate (ex-ship)	.. .. .	"	16	0
" Arseniate, 45 %	.. .. .	"	10	0
" Chlorate	.. .. .	per lb.	0	0
" Borate (Borax)	.. .. .	nett, per ton.	29	10
" Bichromate	.. .. .	per lb.	0	3
" Hydrate (77 % Caustic Soda)	.. .. .	per ton	10	10
" " (74 % Caustic Soda)	.. .. .	"	10	0
" " (70 % Caustic Soda)	.. .. .	"	8	15
" " (60 % Caustic Soda, white)	.. .. .	"	7	17
" " (60 % Caustic Soda, cream)	.. .. .	"	7	10
" Bicarbonate	.. .. .	"	5	5
" Hyposulphite	.. .. .	"	5	2
" Manganate, 25%	.. .. .	"	8	10
" Nitrate (95 % ex-ship Liverpool)	.. .. .	per cwt.	0	8
" Nitrite, 98 %	.. .. .	per ton	27	10
" Phosphate	.. .. .	"	15	15
" Prussiate	.. .. .	per lb.	0	0
" Silicate (glass)	.. .. .	per ton	5	7
" " (liquid, 100° Tw.)	.. .. .	"	3	17
" Stannate, 40 %	.. .. .	per cwt.	2	0
" Sulphate (Salt-cake)	.. .. .	per ton.	1	7
" " (Glauber's Salts)	.. .. .	"	1	10
" Sulphide	.. .. .	"	7	15
" Sulphite	.. .. .	"	5	3
Strontium Hydrate, 98 %	.. .. .	"	8	0
Sulphocyanide Ammonium, 95 %	.. .. .	per lb.	0	0
" Barium, 95 %	.. .. .	"	0	0
" Potassium	.. .. .	"	0	0
Sulphur (Flowers)	.. .. .	per ton.	6	15
" (Roll Brimstone)	.. .. .	"	5	17
" Brimstone: Best Quality	.. .. .	"	4	10
Superphosphate of Lime (26 %)	.. .. .	"	2	10
Tallow	.. .. .	"	25	10
Tin (English Ingots)		"	96	0
" Crystals		per lb.	0	0
Zinc (Spelter)		per ton.	21	10
" Chloride (solution, 96° Tw.)		"	6	0

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SATURDAY, FEBRUARY 22, 1890.

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning**.

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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THE PERMANENT CHEMICAL

THE Permanent Chemical Exhibition is ready for a formal opening, is ad well to enable intending exhibitors to s through the scheme, and to form a good fulness of such a collection of samples a therefore invite our readers to call upon opportunity of explaining what we consi portant feature to the trade.

It may be well to describe what has b present date. The getting in of the exhibi in order after their arrival, is necessarily a one which we cannot well hasten, as the earl our control. The main exhibition room, s page in plan, is now fairly well sprinkled v interesting kind, and there is not much comers. Already the number of callers, t to see, has shown us that when the colle there will be no lack of visitors, and it is make the rooms form a comfortable loo purposes.

The rooms are heated by Musgrave's combustion stoves, and there are writing-r and lavatories, all at the service of visitors, to large and small that may be used for pur or arbitrations. When it is understood t is less than two minutes' walk from the R convenience of having samples and speci deposited there for reference, will be mani

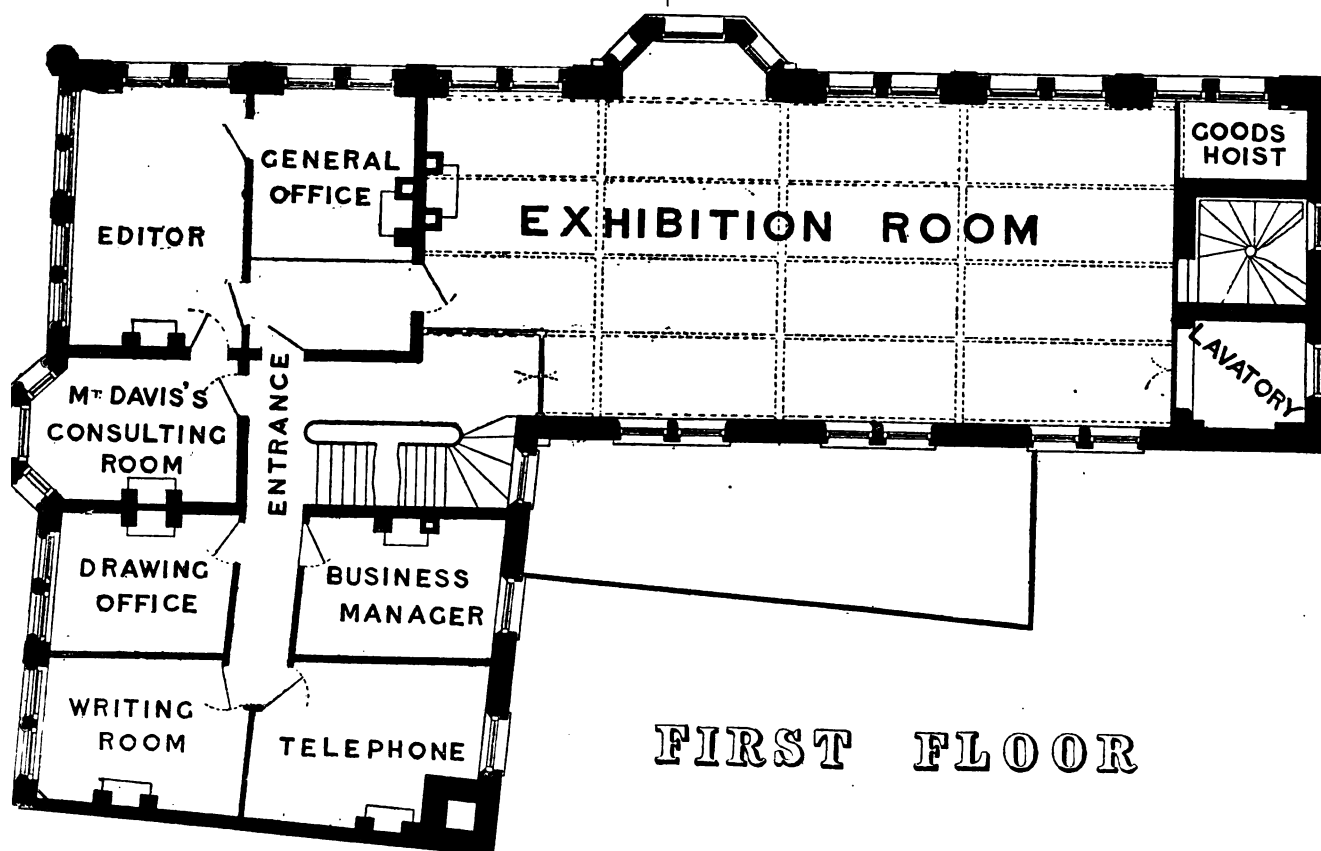
Besides what our exhibitors think fit to paring a series of trade products, that may consulted when required. Our experienc is proba bly as great, or greater, than that technologists, and we shall be pleased to p at the disposal of our friends. Already t an excellent collection of valves, cocks, an useful kind in acid-resisting metal made b Newcastle-on-Tyne; there is the Brachu the Bracher "Desideratum" mixer; pumping engine; one of Davis' patent ar others, amongst the appliances, while dotted about for the exhibition of sa already a neat "kiosk" from the Melbour by Messrs. Brunner, Mond and Co., Limit case of the Clayton Aniline Co., Limit returned from the Paris Exhibition, where medal; Mr. G. G. Blackwell's fine case of Irish Exhibition in London; Messrs. E. D was so admired at the Manchester Royal containing dye woods, dye wood extracts, shaw Bros., Limited, have a case that wa chester Exhibition, showing specimens chemicals. Mr. Alfred Smith, of Clayton, Messrs. Jewsbury and Brown have also ca Doulton and Co., of Lambeth, have also a

on of models of their celebrated stoneware chemical appliances, and the Buckley Brick and Tile Company, of Buckley, near Chester, have a stand showing the most important of their wares, used in the Chemical and Allied Industries. A mural tablet of the firm of Messrs. Chas. Lowe and Co., of Reddish, proclaims the nature of the various phenol products manufactured by them. A very interesting exhibit of injectors, ejectors, and air-blowers is being fitted up by Messrs. Melrum Bros., which will give visitors a good idea where to fill their requirements, while on a wall near the case of the Manchester Aniline Co. (Chas. Truby and Co.), is a Blackman air-propeller in course of erection. The practical side is enlivened by a collection of chemical literature exhibited by the enterprising Mr. W. F. Clay, of Edinburgh, with whom, no doubt, most of our readers are acquainted.

This short notice will give an idea of the scope of the exhibition; its usefulness goes without saying, and we can do much through the medium of the *Chemical Trade Journal*, bringing before the notice of those interested in such

matters the chief objects of interest contained within the walls of the building. Some of our readers may think we have made but slow progress; if it has been slow, we hope it has been sure, and the enquiries we are now receiving day by day from a distance, without any undue advertising, has made us very hopeful of the future. There can be no doubt that such a collection as we are getting together will be of immense use to all engaged in the Chemical and Allied Industries; there need be no trade secrets brought within our walls, there are plenty of things in the ordinary daily run of trade, interesting and useful, and we do not know of any other place in the British Isles where such things could be exhibited to greater advantage to the exhibitor than under the roof of the *Chemical Trade Journal*.

Most of our readers will be unaware of the nature and number of the enquiries on trade matters, we receive by each post; it would be the advantage of everyone if, as a reply to most of these queries, we could point to an exhibit in the PERMANENT CHEMICAL EXHIBITION.



THREATENED STRIKE IN THE COAL TRADE.

THE LONDON CONFERENCE.

A CONFERENCE of the Miners' Federation was held at Westminster Town Hall, on Saturday afternoon last, to consider the titude to be adopted towards coalowners in reference to the miners' demand for an advance of 10 per cent. in wages. The proceedings were private, but representatives of the press were informed that Mr. Rickard, M.P., presided, and delegates attended from Yorkshire, Lancashire, Derbyshire, Notts, Warwickshire, Leicestershire, Staffordshire, Shropshire, Dean Forest, North Wales, Monmouthshire, Somerset, and Ayrshire, representing altogether over 350,000 miners. Reports on the wages question were handed in, and after a prolonged discussion a resolution was unanimously carried to demand an advance of 10 per cent. on all underground wages, and pledging all the counties, federations, and districts to co-operate in giving in notices and bringing in tools, and also providing that if the advance be not conceded all

round no district, county, or federation be allowed to accept it except on lines laid down in rule 20 of the Federation. It was resolved to terminate all contracts in the week ending March 15, and the Conference was adjourned to that date.

The associated coalmasters in Dean Forest, having declined to advance colliers' wages 10 per cent., have been again approached by the miners' agents for 2½ per cent. advance and the payment of wages weekly, but this has been rejected. The masters, however, have offered to call in an accountant to ascertain the actual state of trade if the miners will abide by the result, but this is considered improbable.

The apprehended strike amongst Durham coal miners was anticipated on Saturday by an important meeting of delegates and workmen from about 30 collieries in the eastern part of the country, which was held at Easington-lane. The determination already arrived at, to stop work unless the further advance in wages asked for is granted, was fully confirmed.

Colliery firemen and boiler minders are agitating for 8 hours instead of 12 as a day's work.

THE SEWAGE OF STACKSTEADS.

CHEMISTS AT VARIANCE AGAIN.

ON Thursday, the 6th inst., Mr. S. J. Smith, one of the Inspectors of the Local Government Board, commenced an enquiry at the Court House, Bacup, relative to the petition of the Bacup Corporation to the Local Government Board, praying for the issue of a provisional order to empower the Corporation to put in force with reference to certain lands at Glen-top, required by them for the purpose of sewerage and sewage disposal, the powers of the Lands Clauses Consolidation Acts, with respect to the purchase and taking of lands otherwise than by agreement.

The Town Clerk was called and examined by Mr. Addison. He said he became clerk to the Local Board in 1874. The Local Government Act was adopted in the district in December, 1863. The population at that time was about 14,000, and the rateable value was £33,000. In September, 1876, the district was extended under a provisional order by the addition of Stacksteads. Before extension the area of the district was 1,600 acres, and after extension 6,400. The present rateable value was £78,888.—£7,162. on land, and £71,725. 15s. on buildings. The population at the last census was 25,034, and it was estimated at present at 26,000.

The Inspector: Then it has not increased much.

The Town Clerk: There has only been the natural increase.

The Inspector: I should call it unnatural.

The Town Clerk: There have been a large number of removals from the district.

The Town Clerk, continuing, said the amount owing on the 1st Feb. to the Public Works Loan Commissioners in respect of main sewers was £5,440. 19s. 7d. and to the same authority in respect of the Market House £1,333. 6s. 8d. Then on account of the town's yard there was a balance owing of £850., and in respect of property in St. James'-street and the new bridge over the Irwell £793. 6s. 8d. was owing, and for private improvements there was a balance owing of £180. The total amount owing was thus £8,297. 12s. 11d. The assets were as follows: Market House, £7,100. 4s. 6d.; St. James'-street property, £1,201.; town's yard, £1,400.; cemetery, £16,479. 12s. 4d.; main sewerage and public works £17,631. 19s. 10d.; police-station and court house, £2,000.; total, £45,812. 16s. 8d. A penny rate produced £300 in round figures.

The Borough Surveyor (Mr. J. Wilson) said he had been surveyor since 1870. He was instructed to prepare plans for the sewerage of Stacksteads in 1887. The district proposed to be sewered comprised seven cotton mills, two woollen mills, two breweries, 1,373 houses, 85 ashpits, 415 privies, and 20 waterclosets. At present the district was drained with the old-fashioned stone drains, some of them were about nine inches square and some got up to a foot. 84 of them drained into the river and 31 into the mill lodges. It was proposed to have two sewers—a high-level sewer (which was pointed out on a plan on the wall) 4,880 feet long, varying from 18 inches to nine inches at the top. The greater length was 18 inches. The shallowest depth would be ten feet, and the greatest depth 20 feet. Mr. Wilson gave full details as to gradients, manholes, ventilators, &c. The low level drain (which was also indicated on the plan) varied from 12 inches to 18 inches. The shallowest depth was two feet below the bed of the river, and the greatest depth 23 feet six inches. The two sewers joined opposite No. 491, Newchurch-road, and continued then to the tanks by a two-foot pipe. It was proposed to receive $\frac{1}{4}$ inch of rainfall for the whole area, or $\frac{1}{4}$ inch for the drained area in 24 hours. The minimum flow of sewage was estimated at 123,560 gallons in 24 hours, or 20 gallons per head of the present population. It was intended to utilise the existing drains for conveying surface water to the river. Every part of the district would be supplied with new drains. The sewage on arriving on the ground would be passed into the dredging chamber, where it would be passed through a fine screen which would take out all the solids.

Afterwards it would flow under the engine-house, and during the time it was passing under the engine house, it would receive a solution of lime and alumina. There would be proper mixing machinery. Then it would flow into the pump well, and it would be lifted into the inlet chamber. It would be lifted about 20 feet. Then it would flow into tank No. 1, which would be 90ft. by 40ft. and six feet deep. It would then be passed into two other similar tanks; then it would fall over three cascades and then to the filtering beds, four in number. All the works and the tanks would occupy an area of 3a. 1r. 22p. and 16yds. He considered the site a very good one in every respect, and in fact, it was the only available site in the borough. There were 56 houses in the borough in Cowpe Valley. He did not think it was possible to drain them into the proposed works. Under the 28th section of the Public Health Act they could call upon the Rawtenstall Local Board to drain these houses. He estimated the total cost at £18,000., and he considered it would cost an additional £15,000. to go through Rawtenstall. There was the additional cost of the sewer, and they would have to rob the river for over five miles. In the distance there were 32 mills obtaining water from the river.

Dr. E. Frankland, F.R.S., was examined by Mr. Addison. He said he had had an enormous experience in the treatment and purification of sewage in this and other countries. He had looked into the scheme they were now enquiring into. He believed the method that was contemplated to be adopted here, both in regard to chemical treatment and to subsequent purification was the best method at present known. As regarded the chemical treatment, it was a consecutive application of sulphate of alumina and lime. The alumina was generally added first. The best works he was acquainted with were at Coventry. After passing through the tanks and the subsidence of the precipitate, the liquid was clear and usually colourless, unless there was dye water in the sewage. It was then passed through land by what was known as downward intermittent filtration. In that process nearly the whole of the remaining organic matter in the effluent was entirely removed. It passed out of the land mainly as gases, and therefore the land did not get clogged or exhausted by the prolonged filtration of effluent of this kind. He had examined this particular plot of land for filtration, and he thought it was particularly well adapted for this process of intermittent filtration. He had not only seen the land *in situ*, but had a sample brought to his laboratory, and had analysed the soil obtained from one of the trial holes. In the first place the soil previously dried in air contained 51.9 per cent. of stones, varying in size from half-an-inch to 3in. in diameter. Nearly the whole of it was a very porous material of such a varying coarseness as one would make as an artificial filter. He should not like to say the area would be quite sufficient for a population of 15,000, but it would be quite sufficient for double the present population. In a process of this kind the sludge was pumped through underground conduits directly into presses, and a large proportion of water was pressed out, and what remained was a firm consistent cake that could be carried about and did not not readily putrify, and which only contained then about 49 or 50 per cent. of water. There would be no nuisance whatever unless the works were carried out in a slovenly way, and no possible injury to health. That had been proved over and over again. At Coventry there were villa residences as near the filtering beds as in this case, and he was informed that no complaints had been received. A very pure effluent would be discharged, which would contain less organic matter in all probability than the Irwell on entering the borough. So far as his knowledge went this was the best possible scheme that could be devised, so far as chemical treatment and purification was concerned. The commission of which he was a member was decidedly of opinion that each district ought to deal with its own sewage, and discharge the effluent into the river as soon as possible.

Mr. Sutton cross-examined Dr. Frankland at great length as to the chemical processes involved in the method proposed to be adopted, and quoted from published works of Dr. Frankland. There was no free lime left in the sludge. The sulphate of alumina took out about one-half of the polluting matter, and it was proposed to get rid of the other half by a filtration process. There might be a mere trace of sulphuretted hydrogen about the works, but he did not think it would affect the health of the people living about. He did not think there would be any difficulty in disposing of the sludge cakes. If they could not dispose of them they might store them or bury them. If the worst came to the worst they could burn them, but he should not think that would be advisable. At Coventry they had no difficulty in disposing of them. They could not make them fast enough. They were worth from 1s. 6d. to 2s. 6d. per ton. He did not think the sulphate of alumina would have any effect whatever on woollen manufacture. The harder the water the more soap must be used, but any increase of expenditure would be a vanishing quantity, perhaps $\frac{1}{4}$ d. in the pound. It would have more effect on calico print works than on woollen works.

Two samples of woollen goods were handed in, which showed a considerable difference of texture, but Dr. Frankland did not think the difference had been produced by sulphate of lime. It had probably been brought about by some corrosive material. He did not think it was advisable to have the sewage carried right out of the borough. He thought it was best to return the purified water to the river as soon as possible. Any advantage to be derived from carrying the sewage away from the population was counterbalanced by depriving the river of so much water, and inasmuch as it could be successfully treated, without nuisance in the midst of the population, he did not see what advantage there would be in going to great expense in removing it from the district. He did not think it would depreciate Mr. Disley's house or the cottages adjoining. He had not seen any property near that would be depreciated at all. He would prefer these works to the existing conditions if he lived there. He did not imagine it would have any effect on the maling which was proposed to be carried on near.

Mr. Charles Estcourt, analyst to the city of Manchester, put in analyses of six samples of sewage obtained from the outlet at Acremill, the results of which were not stated, except that it was a very dilute sewage, compared with Manchester. He had heard Dr. Frankland's evidence, and he agreed with the opinions expressed by the doctor.

Mr. Melliss, C.E., was called and examined by Mr. Addison. He said he had devised and constructed the sewage works at Coventry and other places, and had several similar works on hand at present. He had looked at the plans of the borough surveyor, and generally the scheme for the sewerage and sewage treatment of this part of the borough seemed to be a very suitable scheme, and a very good scheme. It was a well-devised scheme, and quite up to date. There would be no smell or nuisance from these works if they were properly conducted. The weekly amount of sludge would be about ten tons, not more. Cross-examined by Mr. Sutton: He proposed to use from seven to eight grains of sulphate of alumina, and six grains of lime per gallon. There was generally no difficulty in getting rid of sludge cakes. Cross-examined by Mr. Woodcock: There was no sewage tank at Coventry, but he had known them at other places, and they were quite unobjectionable.

Mr. E. F. Coddington, examined by Mr. Addison, said he had been manager of sewage works at Coventry for 16 years, and before that he had been manager of other works. He was well acquainted with the purification processes of other towns. Coventry had a population of 50,000, and they dealt with 2,000,000 gallons in 24 hours. There was no nuisance whatever, and no complaints from the neighbours; and they had no difficulty in disposing of the sludge cakes. Cross-examined by Mr. Sutton: They used to sell the sludge cakes at 1s. a ton, but there was such a demand for it that the Corporation had raised it to 1s. 6d. a ton. The farmers put it on their fields. At present they were using $8\frac{1}{2}$ grains of sulphate of alumina to the gallon and 6.4 grains of lime. There were no works on the river below where they turned in the effluent. The works were about a mile from the centre of the town, and just outside the municipal boundary. It was in a nice open country, not a narrow gorge, as here.

This concluded the case for the Corporation.

Mr. Sutton, for the opposition, held that the case for the Corporation had not been made out, and said it was incomplete in three respects. It was incomplete because they were really intending to renew in a great measure the filtering tanks at Acremill.

The Inspector said that question was not before him, and he could not go into it.

Mr. Sutton said there were still two other points fatal to the application. In the first place in Stacksteads there was included the Cowpe valley, which must be drained, and it was admitted they had made no provision for draining it here. The surveyor said it was practically impossible to do it except at very great expense. Thus while they were applying for land to drain Stacksteads, there was a portion of the district they could not drain at all. Then it was admitted in answer to a question from the inspector that the present stone drains must be replaced.

The Inspector: That is the subsidiary drains. That is no part of the sewerage.

Mr. Sutton: But it is part of their plans. When they come to borrow the money I shall have something to say about that.

The Inspector: All they are seeking now is compulsory power to acquire this land.

Mr. Sutton: On purpose for their sewage scheme. He would also prove that the scheme was a most extravagant scheme. They had omitted in the Glentop estimate the cost of pumping, which would be £259. a year, and that, capitalised at $3\frac{1}{2}$ per cent., came to £7,500. Then the surveyor said the drain to Rawtenstall would cost £21,000., but whether he meant it was the total cost of the Bacup proportion did not seem to be quite clear. But whichever was meant he would show that it was absolutely wrong. If it was meant to be the Bacup proportion, then that gave the total cost for the sewer at £42,000., which was absolutely out of the question, and a sum which even the surveyor flinched at when it was put to him. If it meant that the total cost of the sewer would be £21,000., then they had £10,000. to take off the Rawtenstall estimate. It was thus evident that the Rawtenstall scheme would be the cheaper of the two. Then with regard to the effluent, it was all very well to come and say it did no harm in a district like Coventry, but here his clients lived upon their trade, and anything that would damage the manufactures of the district was of vital importance. He should produce evidence to show that this effluent would seriously damage these works. With regard to the nuisance, it was clear there would be a nuisance, unless the works were carried out in an absolutely accurate way, if not in any case.

Mr. John Newton, C.E., examined by Mr. Sutton, said he had been in practice for 30 years, and had carried out a large number of sewage works in various parts of the country. He was well acquainted with the Bacup and Rossendale Valley, and he had surveyed the district with a view to this enquiry. He had inspected the site to be acquired, the land at Ewood Bridge, and at Acremill. The proposed site at Glen-top comprised 3a. 1r. 20p. Three-quarters of an acre, occupied by the mill, was not shown as utilised on the plan. Of the remaining $2\frac{1}{2}$ acres, $1\frac{1}{4}$ acres were shown as filtering areas, and the rest for tanks and buildings. He did not consider that sufficient for the purpose. He thought that Glen-top site was an unsuitable one, it was so shut in, and because it was so enormously expensive. They would require pumping engines

which would cost £750., and this would involve working expenses of at least £185., which if capitalised would amount to £5,000. By the Inspector: It could not be treated within the borough except by pumping. Cross-examined by Mr. Addison: He had designed about thirty sewage works. Some of them were nuisances, and some were not. Some of them were nuisances because they were carelessly conducted.

Charles Burghardt, Ph.D., examined by Mr. Sutton, said he had considered the Bacup sewage scheme from a chemical point of view. In his opinion it was not the most efficient method that could be devised. It would produce emanations at times of foul vapours or gases which would be a nuisance and a probable injury to health. The treatment with alumina and lime was simply a mechanical and not a chemical process. It purified the sewage to a certain extent, but not as completely as other methods would do. He considered that hydrated oxide of iron was the best purifier. In the scheme proposed, the sulphate of lime in the effluent would harden the water, which would cause a serious loss in soap to the print works. Cross-examined by Mr. Addison: The iron system was in use at Buxton. The Inspector: Oh; I know Buxton. Witness did not wish to throw doubt on the Coventry scheme.

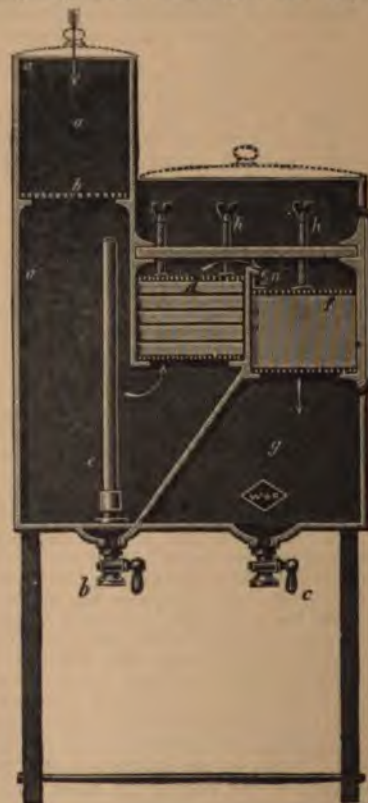
Mr. J. Carter Bell said he had made experiments on a large scale to find what quantity of organic matter was held in solution in the effluent when treated with different systems of sewerage. The amount of sulphate of lime and other solid matters in solution in this effluent would be from 70 to 80 grains to the gallon, which would have a serious effect on the manufactures of the district. He considered that in a confined space like this these works would be very objectionable.

Mr. Alderman Disley, examined by Mr. Sutton, said he was the owner of Waterbarn Mills, and the owner of some of the land in the vicinity. In case of increasing his works he would probably have to go in the direction of the land now scheduled. It was part of the land which he purchased with the mill. The rateable value of the mill was £515. He only used the river water for power. He employed about 100 hands. His house was about 40 yards from the proposed works. The prevailing winds would bring the emanations in the direction of the houses. Cross-examined by Mr. Addison: The piece of land proposed to be acquired from him was about 1,000 square yards. It previously belonged to his father-in-law. They had made no practical use of the land hitherto.

The Inspector said he should take time to consider his report.

THE "DIAMOND" PATENT OIL FILTER.

THIS apparatus, shown in the accompanying cut, is intended for the purification of refuse oil. As it is suitable for cleansing practically every kind and quality of this material, it will very readily be seen



that its sphere of application is boundless. The oil must be heated to some point (regulated by its consistency) between 140°-212° F. This is effected by means of piping connected either with the main steam supply or the exhaust. The waste oil is poured into the chamber *a*, where it is freed from the coarser impurities by the grid *b*. It then passes upward through the chamber *d*, which is packed with wadding or soft twist, capable of being compressed or loosened by the tightening screws above. The oil, after passing through this filtering medium, trickles over the ledge *e* on to the top of another layer of twist or wadding in the chamber *f*. Through this it filters into the chamber *g*, and can be drawn off by the cock *i* when wanted. The dirt and water sink to the bottom of the chamber *a*, and are removed periodically by the tap *c*.

When starting the apparatus it is advisable to saturate the filter with clean oil, as otherwise the dry twist would take up so much scum and dirt as to lose its efficiency much sooner than when first soaked with clean oil.

The filtering material only requires changing five or six times a year, and this can be done by any ordinary mechanic in a few minutes, the chief precaution necessary being to see that the twist or wadding is well pressed in at the sides and corners, to prevent the oil from running down through crevices unfiltered.

The manufacturers are Messrs. Woodhouse and Rawson, Limited, 88, Queen Victoria-street, E.C.

Legal.

CHANCERY OF LANCASHIRE.

(BEFORE VICE-CHANCELLOR SIR H. FOX-BRISTOWE, Q.C.)

POLLUTION OF A STREAM.

SCHWABE v. CHADWICK.—Messrs. Salis Schwabe and Co., of the Rhodes Print Works, near Middleton, and Messrs. Lees, owners of land through which runs the Wince Brook, sought an injunction last week to restrain the defendants, Messrs. J. Chadwick and Co., calico printers, dyers, and bleachers, at Oldham, from polluting the stream named in a way to cause injury to Messrs. Schwabe in their works. Mr. Maberly with Mr. Roby appeared for the plaintiffs, and Mr. Stafforth and Mr. Hopkinson for the defendants. Mr. Maberly said Wince Brook was one of the sources of water supply to which the plaintiffs had a right by agreement with Messrs. Lees. The defendants had turned the refuse of their dye works into the stream and polluted it. The works of the defendants were on the bank of the Spring Brook, a tributary of Stock Brook. The Stock Brook entered the Wince Brook, which in its turn was a confluent of the river Irk just above the works of the plaintiffs. The plaintiffs took the water from the Wince Brook near the weir, at the junction with the Irk, and conducted it to their lodges by artificial channels. In 1884 the plaintiffs noticed the water was distinctly polluted with some black substance, and the following year the pollution was traced to the works of the defendants; the defendants were communicated with by the plaintiffs, who pointed out the injury that was being done to them. On the 13th March the defendants replied that the matter would have the immediate attention of the firm. In that letter he held that there was no indication of the line of defence which was taken later, namely, that they had a right to turn their refuse into the brook. A considerable correspondence went on during the following years, but the defendants did not then allege any right to pollute the water, simply making excuses for not taking any steps to prevent the dye refuse from getting into the stream. In 1886 the defendants added four dye-tanks to their works, with the consequence that the output waste was increased. The defendants carried on a very rough dyeing process, having what were called "jiggers"—large vessels containing loose dye, the fabrics being drawn through the dye by means of rough rollers. When the vessels were to be emptied plugs were pulled out at the bottom of the tanks, and the liquid was allowed to run into a gutter, whence it found its way into the brook. It was inevitable, therefore, that a large amount of colouring matter must go direct from the works into the brook. The plaintiffs would be quite satisfied if the defendants would put down catch pans and settling tanks to allow the solids to settle.

The Vice Chancellor said that in order to clear the water from pollution it might first be allowed to stand in settling tanks, where the solids would be precipitated; it could then be allowed to flow through proper filter beds, where the liquid would really be disintegrated and the evil portions that remained would be taken away. The water would then pass into the brook in a comparatively innocuous condition.

Mr. Maberly said that that process would meet all the requirements of the plaintiffs. In fact, something less than the elaborate filter beds his Honour had suggested would perfectly satisfy the plaintiffs. With regard to the pleas now put forward by the defendants Mr. Maberly

said the plaintiffs had never heard of the assertion of a right to pollute until after this action was begun a year ago. In the letters which had previously passed the defendants simply dealt in excuses for delay, and there was no claim of a right.

Mr. Edmund Salis Schwabe, senior partner of the firm of Salis Schwabe and Co., described his sources of water supply, and said his firm had been carrying on business at the same works since 1833. The water supply was of course a vital matter in their business. They had authority to use the water from the Wince Brook under a deed entered into with Messrs. Lees, the riparian owners. He could speak from personal knowledge of the supply since 1861. From 1875 to 1880 there was a gradual deterioration of the water coming from the Wince Brook. The deterioration began to get really serious after 1880.

ROTHESAY.—THE OLD MINERAL WELL.

FOR a long time the old mineral well at Bogany, once so much famed as a medicinal spring, has been lost sight of and neglected, but the Town Improvement Trust recently took up the matter, and had the spring opened up and the well cleaned out. The water has also been analysed by Mr. W. Ivison Macadam, Professor of Chemistry in Edinburgh, the result being as follows:—

	Grains.
Calcium Sulphate	137.04
Calcium Carbonate	15.72
Calcium } Phosphates	0.26
Magnesium Sulphate	170.18
Magnesium Carbonate	6.97
Magnesium Chloride	138.72
Sodium Sulphate	5.37
Sodium Sulphide	0.63
Sodium Chloride	1335.55
Potassium Sulphide	0.31
Potassium Chloride	27.73
Soluble Silica	0.25
Ferrous Carbonate	0.17
Organic and Volatile matter	8.14
Total solid matter per gallon, 1,847.04 grains.	
	Cub. Inches.
Sulphuretted Hydrogen	22.67
Carbonic Anhydride	3.54
Oxygen	0.91
Nitrogen	5.94
Total gases per gallon, 33.06 cubic inches.	

In his report on the well Mr. Macadam says it is most nearly allied to the famed Harrogate springs, and that in many respects it compares favourably with the Strathpeffer wells. For medicinal purposes he says it will be found fully as good as the Harrogate water, and from the greater quantity of saline material superior for baths. As compared with Strathpeffer, the Bogany water will be found superior in cases requiring salts along with sulphuretted hydrogen, and equally good when sulphuretted hydrogen alone is necessary. He sums up his report by saying that in his opinion the Bogany well is of high-class quality as a medicinal water, both for internal and external use, and if properly cared for and attended to, would be a valuable addition to the many advantages Rothsay offers to those in search of health. It has been remitted to a committee to make inquiry and to report as to the best means of protecting the well and making it available for the public use.

PHOTOGRAPHIC NOTES.

A PLATINUM TONING SOLUTION FOR SILVER PRINTS.

M. GASTINE recommends the following:—

A.	
Water	9¼ oz.
Sodium chloride	300 grains.
„ bitartrate	150 „
B.	
Water	3¼ oz.
Bichloride of platinum	150 grains.

Add two drachms of B to A and tone. "It is advisable," says the author, "to eliminate the silver salts from the paper by one or two washings before toning. If bitartrate is not at hand, take five parts of tartaric acid and mix with four and a half parts of carbonate of soda."

GELATINOUS BOTTLE WAX FOR COVERING CORKS.

In storing volatile liquids which are solvents of resinous material, the ordinary bottle wax in which bottle necks are ordinarily dipped is generally inadmissible, by reason of the solvent action of the liquids upon it. In such cases the following answers admirably, giving a

ct closing; and, moreover, the top is easily pared off with a when the bottle is to be opened:—

Soft gelatine or good glue..... 3 parts.
Water 9 "
Glycerine 2 "

elt the gelatine in the water, and then stir in the glycerine. Any ring matter can be added, and the necks should be quite free grease when dipped. A second dip can be given if the first does give a sufficient thickness. Manufacturers, sending out photo-hic preparations containing volatile liquids, should give this aration a trial. The top can be stamped while soft with a slightly sed metal seal, or, when set, a warm stereotype (slightly oiled) or ndia rubber stamp may be used.

J. H. BIGGS' METHOD OF MAKING SILVER PRINTS ON ROUGH DRAWING PAPER.

SALTING SOLUTION.

Soft sheet gelatine 4 grains.
(about .0259 gramme)
Sodium chloride (common salt) 5 grains.
(about 0.324 gramme)
Water 1 ounce.
(about 28 cubic cents.)

oak the gelatine and dissolve in a water bath. Whatman's drawing er is floated on this and allowed to dry spontaneously.

SENSITIZING SOLUTION.

Nitrate of silver 60 grains.
(about 3.88 grammes)
Water..... 1 ounce.
(about 28 cubic cents.)

Ammonia is added, drop by drop, till the precipitate formed is just redissolved.

the paper on a flat board, the salted side up, and apply the sensi- g solution freely with a Buckle's brush. Pin the paper up by one aer, attaching a fragment of blotting paper to the opposite corner, revent the accumulation of solution. When dry, print, tone, and as in the case of a paint on albumenised paper. Mr. Biggs recom- nds a carbonate of soda toning bath. For description of the Buckle sh, see next paragraph.

THE BUCKLE'S BRUSH.

This useful implement was quite common and well known in the ly days of photography, when negative paper processes were much d, and is very useful when it is important to have a clean brush, or her mop, for every operation. It is made by taking a piece of glass e, about half an inch in diameter and six or seven inches long, and wing a tuft of cotton wool partly into one end of it by a thread or ook of silver wire, an arrangement easily extemporized.—*Photo- ropic Review.*

IMPROVEMENTS IN THE MANUFACTURE OF STARCH.

N interesting paper was read before the "Vereins der Starke- l Interessenten Deutschlands," by Saare, on the "Difference in ality of Moist Starches." The chief impurities found are fibre, id, and remains of the pulp water. The water varied from 47.5 to per cent., the average being 48.5 per cent. The impurities ranged m 0.1 to 1.5 per cent., average 0.5 per cent. Sand averaged 0.22 r cent. Fibre was found from 0.01 to 0.3 per cent., average 0.15 r cent. The impurities soluble in water varied from 0.08 to 0.2 per nt., mean, 0.12 per cent. To prevent the introduction of sand into e finished starch, the portion which settles in the washing tank next the axis of the stirring apparatus should be removed and not mixed th the rest of the starch. Fibre gets into the finished starch owing to perfect arrangement of the sieves. Pulp water remains in the starch ing to bad washing. Spoilt and sound potatoes of the same origin re also examined. In the case of spoilt potatoes a considerable loss (—40 per cent.) takes place during the preliminary washing, besides ich a large quantity of slime forms on the sieves, and a dark pulp ter, which ferments later on, is obtained. The starch settles very sely, and after draining contains 67 to 70.5 per cent. of water, ilst starch from sound potatoes contains an average of 48.5 per cent. ter. The addition of 1 grm. of sulphuric acid per liter of water es the starch to separate somewhat cleaner. Calcium bisulphite s a similar, but superior effect. The fineness of the sieve mesh has o some influence on the purity of the starch obtained. As regards e pulpy mass remaining after the starch has been washed out, not re than 5 per cent. of the starch remaining in it should be remove- le by washing, and not more than 50—60 per cent. of the dry, mpletely washed pulp should consist of chemically bound starch.—*ingl. Polyt.*

THE NATURE OF ELECTRICITY.

SOME years ago a controversy raged somewhat hotly with regard to the question as to the nature of electricity, whether it was a fluid in itself or merely a peculiar condition assumed by matter. General opinion has now settled down in favour of its being a condition some- thing like polarisation taken up by matter, and many experiments adduced in favour of that assumption are familiar to scientists. Pro- fessor S. P. Thompson, the director of the Finsbury Technical College, London, has just exhibited at the Physical Society some experiments which would furnish powerful arguments in favour of the fluid theory. He made use of the interesting Lichtenberg figures formerly employed in the lecture-room, but not much known now. They are figures pro- duced on the surface of a cake of pitch, shellac, or resin, by discharging a Leyden jar, which has been previously charged with high-tension electri- city by means of a frictional machine. The knob of the jar is rubbed over the surface, discharging electricity upon it; then lycopodium or flower of sulphur is sprinkled over the slab or cake, and the powder adhering to the pitch forms peculiar figures resembling the twigs and branches of trees or leaves, according as the charge previously given to the Leyden jar was of positive or of negative electricity. Professor Thompson modifies the experiment by holding the Leyden jar firmly in his hand, and as it were throwing electricity from the charged knob at the disc, instead of rubbing the surface with it as is usually done. After doing this several times in front of different parts of the plate he again peppers it with the dust, and the result is seen in the presence of figures which do not at all resemble those of Lichtenberg, but rather look like the splashes from a heavily charged paint-brush loaded with colour, thrown on to the surface in the manner employed by bookbinders when pro- ducing the well-known mottled edges of books, or by decorators in imitating granite. Professor Thompson finds that the forms of these figures, which he has called electric splashes, vary with the size, degree of polish, &c., given to the knob of the Leyden jar, and attributes the phenomenon to some modification of the so-called brush discharge; but the experiment is a novel one, and its exhibition created much interest on the part of the audience.

THE ECONOMY OF FUEL IN THE DISTILLATION OF AMMONIACAL LIQUOR.

I N these days of small margins of profit, the manufacturer can no longer afford to throw anything away until he is quite certain that its capacity as a revenue producer is exhausted. Applying this principle to the distillation of ammoniacal liquor in the column-still, one is struck by the fact that in the process, as ordinarily conducted, the spent liquor leaves the still at a boiling temperature, containing the heat equivalent of a considerable quantity of fuel. These few remarks are intended to shew how, in the case of the Davis still, this heat may be recovered and utilised.

In the case of the Davis still, the spent liquor escapes from the ap- paratus through a series of U tubes. It is proposed to cause these U tubes to pass through a water-tight box of any convenient shape and material, and the ammoniacal liquor to be treated is conducted through this box on its way to the still, so that it becomes heated by contact with the U tubes, through which the spent liquor is escaping. In one works this arrangement has been already adopted, and answers very successfully. The temperature of the ammoniacal liquor is raised to 180°F., while the spent liquor only registers 112°F. as it escapes to the drain. Where other means are adopted for the pre-heating of the ammoniacal liquor, the "Economiser" (as the apparatus is called), may be employed to heat water for the boiler supply, or for any other purpose.

In certain cases it may be desirable to substitute a coil of pipes for the series of U tubes but, if this is done, care must be taken to so arrange the coil that it forms a seal equivalent in its effect to the U tubes.

These outlet tubes or coils may be best cleaned out by connecting temporarily with a high pressure water supply, communication with the still being of course cut off while the flushing or cleansing operation is going on. A mixed jet of steam and water, where it can be got, answers this purpose very effectually.

It may be thought by some that the saving to be effected by the use of the "Economiser" is insignificant. Compared with the differences between "ancient" and modern stills, this saving may appear a small one, but it must be remembered that the field of the economist is much more restricted in its area than was the case some few decades ago. We are very much nearer the goal of theoretical perfection, and our rate of progress must be expressed in smaller units. Those manufac- turers who fail to appreciate small individual improvements, are con- siderable losers in the aggregate, and are among the first to drop out from the struggle where the fittest only survive. The proverbial sweet- ness of little fishes has its parallel in the acceptableness of small economies.

THE SORTING AND CLEANING OF COAL.

A time when considerable attention is being given by colliery proprietors to the subject of coal preparation and separation, the Mining Institute of Scotland, has rendered valuable service to the coal mining community at large by the appointment of a special committee of members of the Institute to visit collieries in Great Britain for the purpose of examining and reporting upon the various machines and methods of cleaning, sorting, and preparing coal for the market. The result of the committee's investigations is now before us in the current issue of the Institute's *Transactions*, which, with the forty-seven illustrative plates, forms an invaluable addition to present-day mining literature.

The report describes separately the arrangements at each colliery by itself, instead of attempting a classification according to the various systems, because at several collieries more systems than one are in operation.

The committee were afforded opportunities of inspecting various methods of coal cleaning in operation, and in their report give ample descriptions, including details as to cost, etc. The following washing plants are reported upon:—The Bash washer at the Cwm-Avon Works, South Wales, Glencleland Colliery, Wishaw, and Blairhall Colliery, Perthshire; the Bell and Ramsay washer at Flimby Colliery, Maryport; the felspar (Coppee) washer at the Cwm-Avon Works, Dowlais Works, and Celynen Colliery, in South Wales, Clifton Colliery, Manchester, Moresby Colliery, and Whitehaven Colliery, Whitehaven; the Robinson washer at Barrow Colliery, Barnsley, Clifton Colliery, Manchester, Earnock Colliery, Hamilton, Craighead Colliery, Blantyre; the Sheppard washer at Llwynypia Colliery, South Wales, St. Helens Colliery, Cumberland; and the trough washer at Llwynypia Colliery, South Wales, Aldwarke Main Colliery and Nunnery Colliery, Sheffield, Flimby Colliery, Maryport, Lodge Colliery and Longrigg Colliery, Lancashire.

The subjoined are the general conclusions at which the committee have arrived: "The methods and appliances in use in any one district can seldom be adopted as a whole in a similar form in another. This applies in many instances to collieries in the same district, and even to different seams worked by the same shaft. The nature of the coal, the associated and interbedded strata, the skill, customs and prejudices of workmen, the markets to be supplied, the varying requirements of competition and the caprice of the public have all to be taken into account when designing plant for classifying and cleaning coal. While coal with marked characteristics can with care be selected underground so as to be filled separately, no process can be profitably applied underground for effectually removing refuse, especially the smaller particles. To clean coal properly it must be treated on the surface. As a considerable percentage of dross is made in transit from the cage to the railway wagon, it is evident that the best results are got where attention is paid to the form of hutch and tumbler, the inclination of screens and the drop into wagons, and this is specially important in the case of soft coals. A number of contrivances to lessen breakage are mentioned in the report. The careful hand-packing of large coal into wagons, as practiced in the Nottingham district, has advantages. For effective screening, especially when a large output has to be dealt with, there appears to be no better contrivance than the single or double jigger, or shaking screen, going at from 90 to 100 strokes per minute, and having an inclination suited to the class of coal to be dealt with. There is a preference for wire meshing for such screens at some collieries and at others bars or perforated plates are preferred. For picking, the shaking screen just referred to, or the travelling band, or both combined, is the most effective and economical—the band being about 4 feet wide, 40 to 60 feet long, and moving at a speed of from 30 to 60 feet per minute, according to the quantity of coal to be passed. Ample length of band allows large coal to be sized and loaded into separate wagons by hand with despatch and economy. In every case it is necessary that the coal be delivered regularly from the tip hopper to the jigger, or travelling band. This can be accomplished by regulating sluices worked by an attendant, or automatically by the intervention of a slow-motion band. Good light is essential to efficient picking. A rough rule for deciding the number and length of picking tables may be stated as follows:—One picking table for every 30 tons per hour of tripping output, travelling at the rate of 40 feet per minute, and having an effective length of 10 feet for every 3 per cent. of material to be picked off, plus 15 feet. The cost for labour of this system may be taken at about 1½d. to 2d. per ton of round coal for every 5 per cent. of material picked out of that coal. For round coal, say above 1½ inch cube, the dry process is universally employed, and this process can be successfully applied to nuts from, say ¾ inch upwards, where the refuse does not exceed 2 to 3, or even 4 per cent.; and the table capacity required, judging from the examples in the report, is about one table for every 20 tons per hour, travelling at the rate of 30 feet per minute, and

having an effective length of 15 feet for every 1½ per cent. of material picked off. The cost for labour will probably be from ¾d. to 1¼d. for every 1 per cent. picked off. Balanced screens, on which the coal is picked, are available only when the amount of material to be picked off is very small, say 1 to 1½ per cent. For all small under ¾-inch, and for dross from 1½ inches downwards, with more refuse than from 2 to 4 per cent., the wet process is most applicable. In the wet process it is desirable to have the arrangement so that the small coal can be delivered direct from the screens into the washing tanks without the intervention of wagons. In all the systems of washing the best results are obtained by sizing the small coal before it reaches the machine. This can most conveniently be done by passing it through revolving screens with meshes of varying size. The supply and degree of pulsation or agitation of the water require careful adjustment to suit the various sizes of coal to be treated, and the relative specific gravity of coal and impurities. To remove the refuse from the smaller sizes, say under ¾ inch, the felspar washer is the most effective. The felspar system is most valuable, where the coal is crushed before washing, and is to be used for coke making. Where the coal and the refuse approach one another in specific gravity, it appears that in some cases the trough washer gives the best results. It is applicable for small quantities only, and requires a large flow of water and extra labour, but it has the recommendation of simplicity and small capital cost. It may also be sometimes utilised as a means of transport where the distance from the pit to the wagons or coke ovens is considerable. The Robinson washer is cheap as regards first cost and upkeep, and requires little water. It largely depends for its efficiency on the attention and skill of the man in charge, who may often be tempted to pass more through it than it can effectually clean. Speaking generally, more elaborate machinery is effective in avoiding waste in proportion to its cost, but the capital charges and upkeep are also high in proportion. Other things being equal, coal will be washed best with an abundant supply of clean water; but the more water used the greater the risk of fine coal being lost and the greater the difficulty of filtration. Water to wash coal for coking should not be often used over again, as dirty water dulls the coke. The particulars furnished as to settling ponds do not give sufficient data to justify any definite conclusion as to their capacity in relation to the quantity of coal washed. In most cases no record was kept of the quantity of water used; but settling ponds are a necessity, and their capacity will depend on the special circumstances of each case. There seems no better way of filtering the foul water, after it has passed through the settling ponds, than pumping it on to the rubbish heap, and allowing it to percolate through, as at Earnock. The washed gum of coal not suited for coking is meantime used almost entirely for firing colliery boilers. Briquettes are made of it to a small extent, but new outlets are required for this product. The large quantity to be treated daily, and the varying nature and proportions of the coal and dirt to be separated, render washing, at most collieries, a troublesome process, and unqualified satisfaction is seldom expressed as regards any machine in use. In some cases the machine may not be quite adapted to the peculiarities of the coal treated, or it may be over-driven, or not have a sufficiency of water, or be allowed to get out of repair, all or any of these causes leading to disappointment as to results. A separate siding for each class of coal is a desirable arrangement. While the investigations of the committee have not led them to prefer and recommend any particular system as the best in all circumstances, the examples given will, it is hoped, be valuable in directing attention to the conditions in which each system reported on is likely to be most successful and profitable, leaving it to individual skill and judgment to adapt and modify as special circumstances may require."

A SATISFACTORY BALANCE SHEET.—The Directors of Brunner, Mond, and Co., Limited, Winnington, Northwich, state that the balance-sheet and profit and loss account show a balance to the credit of profit and loss account on the working of the half year ended on the 31st December, 1889, of £120,640., which, with the amount of £15,735. brought forward from the previous half year, makes a total of £136,375. The Directors propose to deal with this balance as follows:—Dividend on the preference capital at 7 per cent. per annum, £11,944.; dividend on the ordinary capital at 30 per cent. per annum, £88,125.; amount to be written off patents account, £2,500.; amount to be placed to suspense account, £20,000.; leaving a balance to be carried forward of £13,806. The Directors propose again to place to suspense account a sum of £20,000, towards meeting the cost of the re-modelling of a portion of the plant, which is in progress. The sum of £6,500. has been written off freehold land account, in order to reduce to a reasonable figure the cost of adjoining lands which the directors have felt bound in the interest of the Company to purchase during the last few months, and for which they have been compelled to pay fancy prices. The directors who retire by rotation are Mr. Henry Brunner, Mr. Holland, and Mr. Galloway, all of whom are eligible for re-election.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- H. S.—There is a Directory of Chemical Manufacturers of England, published by Kent and Co., London.
 H. F.—Thanks for the cutting re chimney.
 C. H. A.—We have endeavoured to get the information you require, but merchants are not wishful to part with it.
 J. W. M.—Please send us your list occasionally.
 INQUIRER.—1. No specified distance, but should be at least 50 feet. 2. Should be capable of lifting any quantity.
 MARSHALL.—Your query must be a matter of business.
 B. AND T.—You will see the article was from the "National Druggist of America." It is there where the method is well known, or in Alsace.
 H. H.—Marsh's test is the one most applicable to your case; but you must be sure of the purity of the zinc you employ.
 R. C.—From 10 to 12 lbs. per ton of coal. One per cent. of volatile sulphur would be 22 lbs., but we do not think this has been reached save in one instance.
 CALC.—A table of lime values has already appeared in our pages.
 DYER.—It is quite possible to purify the liquid to which you refer, but not in the way you mention.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE TREATMENT OF MINERAL OILS.

To the Editor of the Chemical Trade Journal.

SIR,—I have always understood that vaselines were products of petroleum, obtainable by filtration only, and without either distillation or treatment with acid or chemicals of any kind. Hence this purity and absolute freedom from compounds which might—and undoubtedly would—act injuriously on the skin, especially when that is in an unhealthy condition.

On account of the great development of the vaseline manufactures and the number of uses—both medicinal and for toilet purposes—to which it is now put, it is of very great importance to dealers and to the public that the former should be able to know whether the article they are offering to the latter is genuine or otherwise.

As I have always understood that pure vaselines or petroleum jellies have never been treated with chemicals—only the spurious or imitation articles being so treated, and consequently produced at a much lower price—I should be glad of a line or two in your next issue from some of your friends who can speak authoritatively on the matter, and can give some hints as to the best means of distinguishing between the spurious and the genuine article.—Yours, etc.,

ROBERT BRADSHAW, JUNR.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

CHESHIRE COUNTY COUNCIL AND THE POLLUTION OF THE IRWELL AND MERSEY.

THE Local Government Board, having received notice from the Cheshire County Council of their intention to apply for a provisional order authorising them to constitute a joint committee representing the several administrative counties on the watersheds of the rivers Irwell and Mersey for enforcing the provisions of the Rivers Pollution Prevention Act, 1876, have requested the county authority to supply them with full information as to the grounds on which the application is based. A statement has been drawn up for the approval of the County Council at its meeting at Chester, on Thursday next, setting forth that the grounds on which the application is made are that the Irwell and Mersey and their tributaries, in consequence of their pollution by sewage and the refuse from manufactories and other places, are offensive both to smell and to sight, and are often injurious to health. Within two years it is expected, the Manchester Ship Canal will be filled with water from these rivers and their tributaries. The Ship Canal will not be a continuous stream, but a succession of ponds with a stream running through them, and the danger to health arising from those rivers will be undoubtedly increased. The Cheshire County Council are concerned directly with the state of the waters of the Ship Canal as it passes through a large number of the Cheshire townships, and indirectly as the communication between Manchester and Salford and Cheshire is so great and continuous that any epidemic in those cities would certainly spread through large portions of Cheshire. There are more than 70 local authorities in the watersheds of the Mersey and Irwell, and only about one-half of them have completed arrangements for constructing sewage works. It is therefore (in the opinion of the Council) necessary that further steps should be taken to enforce the Rivers Pollution Prevention Act, and this will best be done by the appointment of a joint committee, enabling the local authorities to act in unison. The advantage of a joint committee would also, it is conceived, be very great in dealing with the pollution of streams by manufacturers. While it is desirable that the waters of the Irwell and Mersey shall be pure, it is not desirable that the industries which have grown up on their banks should be damaged or destroyed, and the employment of labour thereby curtailed or stopped. It is also most undesirable that the manufacturers within the area of one authority should be dealt with differently from those within another. It appears to the County Council that a joint committee would be much more independent, and would treat all dwellers and manufacturers equally and justly, and would so act that the industries of this wide district should not be injured, nor the real prosperity of its inhabitants be prejudiced. The authorities affected by the proposed scheme are the County Councils of Chester, Lancaster, and Derby, and the county boroughs of Bolton, Bury, Rochdale, Oldham, Salford, Manchester, and Stockport.

THE SALT UNION.—The Directors of the Salt Union, Limited, recommend a dividend at the rate of 10 per cent. per annum for the last half year, carrying forward £41,000.

Market Reports.

REPORT ON MANURE MATERIAL.

The business during the past week has been on a very moderate scale, both in nitrogenous and phosphatic manure material, but at the close there seems to be more enquiry, and prices are perhaps the turn in favour of sellers.

Charleston River phosphate rock is still quoted 11d. per cent. for cargoes c.i.f. to U. K. Ports, but ½d. less would probably be business for land rock, early shipment. Quotations for Somme and Belgian remain without alteration, the business done for U. K. being only on a very moderate scale, but we hear of large transactions on the Continent at full prices. United Kingdom buyers do not seem inclined to purchase for next season's requirements on basis of present prices; they will wait and see what may be the probable bulk of the new sources of phosphate supply, and whether easier freights may not favour lower prices later on. Quotations for Canadian rock remain nominal, and we do not hear of any transactions.

There has been nothing done in River Plate cargoes of bones, the smaller ones offering being held for extreme prices, and the larger ones being rather late for the spring requirements. £5. 10., delivered good U. K. port, is perhaps the nearest value for December shipment.

After sales of East Indian bone meal at £5. 3s. 9d., afloat or for shipment, the market has recovered somewhat; and we don't now hear of any sellers under £5. 5s. 800 tons arrived at Liverpool will be stored without being offered at present, and further shipments about due will also be stored on arrival. So that the quantity available will be in very moderate compass, and sellers seem inclined to demand some advance on recent quotations. We do not hear of any recent business

in crushed East Indian bones, but £5. 3s. 9d. would be accepted for February-March steamer shipment to Liverpool. There are buyers at more money to other ports.

Nitrate of soda is very weak in all positions. Spot price cannot be quoted above 8s. 3d. to 8s. 4½d., according to quality. Due cargoes are worth barely 8s. 4½d., and February steamer shipment may be bought at 8s. 3d. per cwt. ex quay. The combination arrangements do not seem to progress very rapidly, and, meantime, holders are getting frightened by the very heavy visible supply.

Superphosphates remain without alteration. 50s. per ton in bulk, delivered f.o.b. at works.

823 bgs. rough River Plate dried blood sold at 10s. 3d. per unit. of ammonia per ton, ex quay Liverpool, and 400 bags fine quality at 10s. 6d., which price would be accepted for 900 bags similar quality now landing at Liverpool.

METAL MARKET REPORT.

	Last week.		This week.
Iron	51/10½	....	53/8½
Tin	£91 0 0	....	£91 5 0
Copper	47 17 6	....	47 17 6
Spelter	21 10 0	....	23 0 0
Lead	12 12 6	....	13 5 0
Silver	44d.	....	43¾

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	14¾ 15	....	15½ 15½
Mason & Barry	6¼ 6½	....	6½ 6½
Tharsis	4½ 4½	....	4½ 4½
Cape Copper Co. ..	3½ 3½	....	3½ 3½
Namaqua	2 2¼	....	2 2¼
Copapo	2½ 2½	....	2½ 2½
Panulcillo	1 1½	....	1 1½
New Quebrada	¾ ¾	....	¾ ¾
Libiola	3¾ 3¾	....	3 3¾
Tocopilla	1/6 2/-	....	1/6 2/-
Argentella	6d. 1/-	....	6d. 1/-

MISCELLANEOUS CHEMICAL MARKET.

There is a general firmness of tone in all products of the alkali trade. Manufacturers all round are busy, and with the continued scarcity and high prices of fuel the values of all products are tending upwards. Saltcake has become scarce, and is difficult to obtain for early deliveries; 32s. 6d. has been paid for the same in bulk at makers' works. Bleaching powder is firm at £5. 7s. 6d. to £5. 10s., free on rails, and manufacturers are well filled with orders. Caustic soda has again recovered in price, and is firm for spot delivery at £9. f.o.b. for 70%. Makers are still unwilling to sell forward at any concession on present values. Soda ash is firm both for prompt and future deliveries. Chlorate of potash nominally 4¾d. per lb. on the spot, but higher prices are spoken of as probable. Sulphur is in moderate request only. Vitriol still finds ready outlet at current rates. Sulphate of copper is very scarce, and for prompt delivery commands £26. 10s.; forward delivery quoted easier. Aniline oil and salt are being privately sold at easier rates. Alum generally is firmer, better prices being obtained for export trade. Brown lime acetate is rather lower in price and more freely offered; grey, scarce and firm. Potash caustic and carbonate can be had on slightly easier terms for forward shipments. Arsenic is firm, and orders are being freely placed at current rates. Trade in the finer chemicals for textile trades is still quiet, and there is consequently but little movement in values.

THE LIVERPOOL MINERAL MARKET.

The upward progress of prices has further continued, and there is every prospect of same being maintained. Manganese: Arrivals have been very limited, whilst stocks are practically exhausted; prices, therefore, for prompt and forward delivery have still further considerably advanced. Magnesite: Raw lump quiet, raw ground, £6. 10s., and calcined ground, £10. to £11. Bauxite (Irish Hill brand) continues in strong demand, and brings full prices. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have somewhat improved, but the largest proportion has gone into consumption, and prices remain strong, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6. No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 60s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone steady; ground at £10., and

especially selected lump, finest quality, £1 continues in good demand at full prices. Bilbao at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 16s. to 20s. Purple ore unchanged. Spinel ore commands ready sale at full prices. Emery continued to be enquired for, bringing full price quoted at £5. 10s. to £6., and smalls £5. to earth steady; 45s. to 50s. for best blue and palpable ground, £7. Scheelite, wolfram, tungsten metal continue inquired for. Chrome m Tungsten alloys 2s. per lb. Chrome ore: High for at fair prices. Antimony ore and metal have Uranium oxide, 24s. to 26s. Asbestos: Best r brown grades, £14. to £15. Potter's lead firm; smalls, £14. to £15.; selected lux Calamine: Best qualities scarce—60s. to 80s. sulphate (celestine) steady, 16s. 6d. to 17s. £15. to £16.; powdered (manufactured), £1 spar: English manufactured, old G.G.B. brand brings full prices; 50s. for ground English. 50s.; fluorspar, 20s. to £6. Bog ore in fair 25s. Plumbago: Notwithstanding large new unchanged; Spanish, £6.; best Ceylon lump Italian and Bohemian, £4. to £12. per ton. Ferri continues scarce on spot—20s. to 22s. 6d. Ferri easily at advanced figures. Ground mica, £50. offering—common, 18s. 6d.; good medium, 22s 30s. to 35s. (at Runcorn).

WEST OF SCOTLAND CHEN

GLA

Caustic soda on the market has taken the turn d quence of slackened demand, but makers are un this as legitimate, and endeavour to stick to the Bleaching powder, also, is slightly weaker, and getting into stock on terms the least thing more pared with those procurable a week ago. Cry same tendency, and are easier. On the other han is firmer, and rises have taken place in the marke cake (which is scarce), alum, bicarbs, and sulphate mates, at fixed prices, have been in somewhat impr the week. Sulphate of ammonia is very idle indeed, tions are concerned. Eleven pounds, seventeen and sib and makers, being for the most part already fairly wel duction, refuse to do for less. Topmost offers for : £11. 16s. 3d. without result; and there are still fixtures to note. Paraffins are generally fir been put now on the same price footing as h lb. Chief prices current are:—Soda crystals, Tyne; alum in lump £5. less 2½% Glasgow refined £30., and boracic acid, £37. 10s. net Glas less 5% Tyne; caustic soda, white, 76°, £10. 15: 60/62°, £8., and 60/62° cream, £7. 10s., all le bicarbonate of soda, 5 cwt. casks, £5. 7s. 6d., 1 cw net Tyne; refined alkali 48/52°, 1½d., less 2½ 29s. to 31s.; bleaching powder, £5. 10s. to £5. Glasgow; bichromate of potash, 4d., and of sod to Scotch and English buyers respectively; chlor less 5% any port; nitrate of soda 8s. 4½d. to 8s. monia, £11. 15s. to £11. 17s. 6d. f.o.b. Leith; 2nd white, £37. and £35., less 2½% any copper, £26. 10s. less 5% Liverpool; paraffin scal 2½d.; paraffin wax, 120°, semi-refined, 3½ (naphtha), 9d.; paraffin oil (burning), 6¾d. to ditto (lubricating), 86½°, £5. 10s. to £6., 88 890/895°, £7. 10s. to £8. Last week's imports c were 35,906 bags.

THE LIVERPOOL COLOUR M

COLOURS quiet; prices unaltered. Ochres: at £10., £12., £14., and £16.; Derbyshire, 5 best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; 1 Umber: Turkish, cargoes to arrive, 40s. to 50s to 55s. White lead, £21. 10s. to £22. Red lea of zinc: V.M. No. 1, £25.; V.M. No. 2, £2 6. 10s. Cobalt: Prepared oxide, 10s. 6d.; 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. white, 60s.; good, 40s. to 50s. Rouge: Best, £24 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide o £10. to £15. Paris white, 60s. Emerald green, shire red 60s. Vermillionette, 5d. to 7d. per lb.

New Companies.

WELBY'S PATENT LAMP CO., LTD.—This company was registered on Feb. 23, 1894, with a capital of £500, to acquire and work manufacturing patents in New Zealand, and in particular, in connection with the registered agreement, certain rights and interests in the patents of Alfred Welby. The subscribers are:—

Shares.	
1	Mr. Alfred Welby, manufacturer
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1	Mr. Alfred Welby, manufacturer

TAR AND AMMONIA PRODUCTS

Gazette Notices.

PARTNERSHIPS DISSOLVED

The Bankruptcy Act, 1883.
Notice of Dissolution.

Advertisement for the dissolution of a partnership, dated Feb. 25, 1894, under the Bankruptcy Act, 1883.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred K. Davis.

APPLICATIONS FOR LETTERS PATENT.

Benzoline Lamps. J. F. Barker. 1,779. February 3.
Hot Water Heater. T. Thorburn. 1,781. February 3.
The Production of Ozone. T. A. Garrett. 1,784. February 3.
Automatic Flushing Syphon. T. Thomas. 1,789. February 3.
Extraction of Gold and Silver. C. Pfeiffer. 1,794. February 3.
Mechanical Forced Draught Lamp. T. M. Thompson. 1,796. Feb. 3.
Syphons. F. Holens. 1,801. February 3.
Glass Moulding. L. Appert. 1,803. February 3.
Heating by Means of Gas. P. Scharf. 1,804. February 3.
Manufacture of Steel. M. R. Conley and J. H. Lancaster. 1,806. Feb. 3.
Yellow Dye. O. Inray. 1,808. February 3.
Dyeing. R. Holliday. 1,811. February 3.
Dyeing. R. Holliday. 1,812. February 3.
Dyeing. R. Holliday. 1,813. February 3.
Purifying Sewage. G. W. Ewens. 1,816. February 3.
Boiler Furnaces. A. Jobson. 1,817. February 3.
Brick Kilns. (Complete Specification). H. Gurney. 1,820. February 3.
Thermometers for Brewers. P. S. Conran. 1,823. February 3.

Boiler Flues. S. K. Barnes. 1,827. February 3.
 Azo Dyes. B. Willcox. 1,828. February 3.
 Recovery of Float Gold. E. L. Mayer and J. G. Lorrain. 1,842. Feb. 4.
 Filtering Apparatus. W. Holmes. 1,845. February 4.
 Distillation of Ammonia. A. R. Davis. 1,848. February 4.
 Construction of Boilers. C. Arnold and H. Arnold. 1,858. February 4.
 Electrical Apparatus. J. A. McMullen. 1,867. February 4.
 Refrigerating Machinery.—(Complete Specification). T. B. Lightfoot. 1,875. February 4.
 Air Compressors.—(Complete Specification). A. Riedler. 1,877. Feb. 4.
 Electrical Insulators.—(Complete Specification). J. B. Williams. 1,878. Feb. 4.
 Generating and Utilising Combustible Vapours. B. J. B. Mills. 1,883. February 4.
 Pyrotechnic Powders.—(Complete Specification). P. Jensen. 1,884. Feb. 4.
 Air Pumps.—(Complete Specification). A. Berrenberg. 1,893. February 4.
 Enamelling Metals. A. E. Robinson and W. H. Wheatley. 1,894. Feb. 4.
 Insulating Composition. E. Fahrig. 1,897. February 4.
 Treatment of Scrap Tin Plates. W. P. Thompson. 1,913. February 5.
 Manufacture of Alum. F. M. Spence and D. D. Spence. 1,914. February 5.
 Brewing Coppers. C. Gibbs. 1,921. February 5.
 Paving and Building Stone. C. Fifield. 1,934. February 5.
 Oil Lamps. T. B. Burns. 1,935. February 5.
 Recuperative Lamps. E. See. 1,935. February 5.
 Oil Vapour Motors. C. D. Abel. 1,943. February 5.
 Water Softening Apparatus.—(Complete Specification). J. Wright. 1,946. February 5.
 Explosives. H. S. Maxim. 1,951. February 5.

Lamps. T. Bass and T. Preece. 1,957. February 5.
 Yellow Dyestuffs. A. Bang. 1,962. February 6.
 Gas Generating Apparatus. W. O. Kibble. 1,964. Feb. 6.
 Pressure Filters. C. Sellars. 1,970. February 6.
 Electro-plating Metals. S. Wohle. 1,987. February 6.
 Lucifer Matches. W. P. Thompson. 1,995. February 6.
 Brewing. J. F. Littleton. 1,996. February 6.
 Manufacture of Aluminium. G. Shenton. 2,002. February 6.
 Aerated Drinks. J. Wood. 2,005. February 6.
 Air Propellers and Ventilating Fans. W. Sayer. 2,014.
 Disinfecting Candles. H. Oppenheim and G. H. Elliott. 2.
 Apparatus for Heating Liquid and Gaseous Bodies. 2,055. February 7.
 Smelting Tin Ores. A. J. Campion. 2,057. February 7.
 Boilers Used in the Manufacture of Paper Pulp. C. February 8.
 Furnaces for Burning Liquid Fuel. C. A. Sahlström and February 8.
 Water and Gas Pipes. E. S. Barlow. 2,077. February 8.
 Storage Batteries. J. C. Chamberlain. 2,080. February 8.
 Storing Petroleum. W. P. Thompson. 2,089. February 8.
 Secondary Batteries. W. P. Thompson. 2,091. February 8.
 Air Pumps. R. Haddan. 2,094. February 8.
 Treatment of Margarine. P. Wild. 2,104. February 8.
 Switches for Electro-Motors. C. T. Whitmore and W. February 8.
 Treatment of Incandescents. C. Dellwik. 2,110. February 8.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM

LONDON.

Week ending February 14th.

Arsenic—
Germany, £227 Williams Torrey & Co.

Antimony—
Italy, 10 t. H. R. Merton & Co.
Bastia, 94 Johnson, Matthey, & Co.
Porugal, 2 J. Ford & Co.
Melbourne, 6 L. & I. D. Jt. Co.

Ammonia—
U. S. A., £134 Walsh, Lovett, & Co.

Alkali—
Pearl Ash
France, 200 c. F. W. Berk & Co.
Holland, 200 c. Taylor, Sommerville, & Co.

Acetate of Lime—
U. S. A., £202 W. Thatcher.

Acetic Acid—
Holland, 47 pgs. Beresford & Co.
Germany, 104 pgs. A. & M. Zimmermann

Aluminate—
N. S. Wales, £32 W. H. Cole & Co.

Barytes—
Germany, 24 bgs. W. Harrison & Co.
Holland, 44 " "
Belgium, 91 cks. " "
Germany, 99 " J. Matton
" 21 O'Hara & Hoar
Belgium, 500 bgs. A. Zumbeck & Co.

Boracic Acid—
Italy, 20 pgs. J. Puddy & Co.
35 pgs. Howards & Sons

Bone Ash—
France, 3½ c. Arnati & Harrison

Barium Chloride—
Germany, £55 Petri Bros.
" 15 W. J. Cook
" 40 pgs. Petri Bros.

Bone Meal—
E. Indies, 100 t. Bryden & Co.

Brimstone—
France, 10 t. J. Parbury & Co.
Italy, 350 W. C. Bacon & Co.

Cream Tartar—
Holland, 4 pgs. Middleton & Co.
Spain, 9 Webb, Watter & Co.
Germany, £60 Charles & Fox
" 189 A. & M. Zimmermann

Italy, 16 pgs. Thames S. Tug
France, 10 Gellatly & Co.
Holland, 2 W. C. Bacon & Co.
Italy, 31 Thames S. Tug Co.

Copper Pyrites—
Spain, 855 t. Forbes, Abbott, & Co.
La Laja, 772 G. Ward & Son

Caoutchouc—
Columbia, 36 c. Mildred, Goyeneche & Co.
E. Africa, 9 L. & I. D. Jt. Co.
Strts. Settlements, T. Merry & Sons
Madagascar, 17 c. Kebbel, Son, & Co.
France, 2 Middleton S. S. Co.
Strts. Settlements, 31 T. H. Lee
Belgium, 28 L. & I. D. Jt. Co.
E. Africa, 36 L. & I. D. Jt. Co.
" 50 T. Ronaldson & Co.
E. Indies, 14 L. & I. D. Jt. Co.
Madagascar, 6½ Townsend Bros.

Cinchona Bark—
Peru, 430 bls. Patry & Pasteur

Dyestuffs—
Indigo
E. Indies, 151 cts. L. & I. D. Jt. Co.

" 10 Parsons & Keith
" 14 W. Brandt & Sons
" 35 London & Hauseatic Bank

" 15 Elkan & Co.
" 2 cs. L. & I. D. Jt. Co.
" 10 cts. M. Smith
" 109 8 bxs. G. Ward & Sons

" 78 2 E. Elkan & Co.
" 9 1 F. W. Heilgers & Co.
" 33 1 J. Owen

" 107 F. Stahlschmidt
China, 5 cts. L. & I. D. Jt. Co.
E. Indies, 27 Anderson Bros.

" 143 L. & I. D. Jt. Co.
" 130 Arbuthnot, Latham, & Co.
" 11 London & Hauseatic Bank

" 104 T. Barlow & Co.
" 7 Hatton, Hall, & Co.
" 15 F. W. Heilgers & Co.

" 94 J. Owen
" 16 Kaul & Haeulein
" 47 R. & J. Henderson
" 14 Phillips & Graves

" 5 T. Ronaldson
" 449 Pickford & Co.
" 16 L. & I. D. Jt. Co.
" 36 F. Stahlschmidt

" 60 Benecke, Souchay & Co.
" 10 Stansbury & Co.
" 8 Kleinwort & Sons

" 20 Hoare, Millar, & Co.
" 22 W. Brandt & Sons
" 5 F. Huth & Co.
" 2 J. Owen

" 5 F. Huth & Co.
Gambier
E. Indies, 20 pgs. Brinkmann & Co.

" 83 T. J. & T. Powell
Italy, 630 Adamson, Gilfillan & Co.

E. Indies, 92 L. & I. D. Jt. Co.
" 1,282 Beresford & Co.
Sumac
Italy, 50 pgs. J. Kitchin
" 300 Soundy & Son
" 210 Beresford & Co.
" 1,050 J. Kitchin
Italy, 50 pgs. W. France & Co.
" 100 R. Von Glehn & Sons

Valonia
A. Turkey, 41 t. J. Graves
" 25½ J. Graves
" 50 Hicks Nash & Co.

Extracts
France, 100 pgs. Levenstein & Sons
Germany, 50 Fleming Oil Chem. Co.

U. S. A., 80 pgs. Donaldson & Co.
France, 80 Levenstein & Sons
" 50 G. Ward & Son

" 117 Burt, Boulton, & Co.
Holland, 45 Burt, Boulton, & Co.
U. S. A., 25 J. Graves
France, 31 M'Cracken, Fenwick, & Co.

Tanners' Bark
Belgium, 49 t. J. Kitchin
" 5 H. Heule's succrs.

Cochineal
Canaries, 17 pgs. Bruce & White
Germany, 10 Craven & Co.

Gutch
Strts. Settlements, 300 pgs. Anderson,
Weber, & Smith

Logs
B. W. Indies, 58 t. Anderson,
Anderson, & Co.

Fustic
B. W. Indies, 96½ t. Anderson,
Anderson & Co.

Anatto
Ceylon, 27 pgs. Hoare, Wilson, & Co.

Oorchella
Ceylon, 18 pgs. E. Barber & Co.
France, 1 L. & I. D. Jt. Co.
Portugal, 32 pgs. N. Smith

Saffron
Spain 1 pgs. Props. Chamb. Whf.
" 1 T. Allen

Esparto—
Tripoli, 4,000 brls. E. & E. Arbib

Farina—
Holland, 286 pgs. Dunlop Bros.
" 200 Prop. Scott's Whf.
Germany, 100 H. Lorenz

" 70 L. Sutro & Co.
" 20 Fellows, Morton, & Co.
" 50 Anderson, Weber, & Smith

" 100 J. Anderson & Co.
" 200 C. F. Webster & Co.
" 100 J. Anderson & Co.
" 100 bgs.

Glycerine—
Germany, £115
Holland, 100 F.
" 82
Germany, 64
" 860

" 13
Holland, 15
Germany, 63
" 56
" 30

Glucose—
Germany, 25 pgs. 2
" 25 2
" 50 4
" 75 6
" 200 4

U. S. A., 350 57
Germany, 200 2
" 25 2
" 500 5
" 200 2
U. S. A., 50 2
Germany, 25 2

" 400 4
" 68 5
" 110 8
" 32 1
" 200 2
" 25 2

Gutta Percha—
E. Indies, 73 c.
" 59
" 952 Kalt
" 20
China, 50
A. Turkey, 10
" 28 Ke

Galls—
A. Turkey, 2 bgs. K
" 20
" 50
A. Turkey, 10
" 28 Ke

Horns—
France, 200 c.
E. Indies, 420
U. S. A., 26
China, 68
France, 200
U. S. A., 71
E. Indies, 16½

Horn Tips—
France, 104 c.

Manure—

Phosphate Rock		
France, 375 t.	A. Hunter & Co.	
Belgium, 250	B. Jacob & Sons	
U. S. A., 5½	C. A. & H. Nichols	
France, 105	A. Hunter & Co.	
" 212	Lawes Manure Co.	
" 200	Anglo Contl. Guano Works Agency	
Germany, 5	F. W. Berk & Co.	
France, 110	A. Hunter & Co.	

Magnesium		
Germany, 40 pgs	Phillipps & Graves	

Naphtha—		
Germany, 19 brls.	Stein Bros.	
Holland, 8 drms.	Domeier & Co.	
" 9	"	

Nitre—		
Holland, 1 csk.	Spies Bros.	

Ochre—		
France, 10 pgs.	E. & G. Hirsch & Co.	
U. S. A., 200 brls.	W. Harrison & Co.	
France, 40 cks.	G. Steinhoff	
" 35	W. Harrison & Co.	

Petroleum—		
U. S. A., 500 brls.	R. H. Annison	
France, 118	Burt, Boulton & Co.	
U. S. A., 3,400	J. H. Usmar & Co.	
" 35	A. Palliser	
Germany, 50	A. Brown & Co.	
S. Russia, 769	2,807 gls. F. Huth & Co.	
U. S., 1,709 t.	80,000 C. T. Bowring	
Holland, 38 dms.	Burt, Boulton, & H. Hill & Sons	
U. S. A., 150 brls.	Major & Field	
" 9	"	

Pitch—		
Russia, 28 brls.	Vivian, Younger, & Co.	

Plumbago—		
Ceylon, 45 cks.	Doulton & Co.	
" 87	Prop. Chamb. Whf.	
" 191	Lambert & Strong	
" 20	Thames S. Sug. Co.	
Holland, 200	Brown & Elmslie	
Ceylon, 149	Prop. Chamb. Whf.	

Pyrites—		
Spain, 300 t.	Forbes, Abbott, & Co.	
" 28	T. S. Whitehead & Chambers	
Pomaron, 1,120 t.	Mason & Barry	

Potassium Carbonate—		
France, 5 pgs	J. A. Reid	
Germany, 5	Andersen, Becker, & Co.	
France, 10	C. Pawson	

Potassium Prussiate—		
Germany, 9 pgs.	A. & M. Zimmermann	
" 6112	T. H. Lee	

Potassium Sulphate—		
France, 10 pgs.	Weatherly, Mead, & Co.	

Paraffin Wax—		
U. S. A., 265 brls.	H. Hill & Sons	
" 170	G. H. Frank	
" 2,051	J. H. Usmar & Co.	

Paraffin—		
Canada, 200 brls.	G. H. Frank	

Rosin—		
U. S., 439 brls.	F. & S. Chiesman & Co.	

Red Lead—		
Germany, 160 c.	Levin Rowehl	

Stearine—		
Belgium, 16 cks.	Perkins & Homer	
Germany, 330	Craven & Co.	
" 100	W. Balchin	
France, 293 sks.	J. Goddard & Co.	
New Zealand, 5 cks.	Van Geelkerken & Co.	

Sodium Acetate—		
France, £150	Weatherly, Mead, & Co.	
" 150	"	
" 810	J. Burnett & Sons	

Saltpetre—		
Germany, 43 cks.	Craven & Co.	
E. Indies, 1,736 bgs.	L. & I. D. Jt. Co.	
" 615	Henckett du Buisson	

Sugar of Lead—		
Germany, 60 cks.	250 bgs. C. Wimble & Co.	
" 100	T. Merry & Sons	
" 20	Baiss, Bros., & Co.	

Sugar of Lead—		
Germany, 33 pgs.	C. J. Capes & Co.	
" 74	Beresford & Co.	
Holland, 1	Webb, Warter, & Co.	

Sodium Sulphate—

Holland, £60	Prop. Dowgate Dk.	
Belgium, 50	Beresford & Co.	

Sodium Nitrite—		
Germany, £100	Kaltenbach & Schmitz	

Sal ammoniac—		
Holland, £154	Barr, Moering, & Co.	

Tartaric Acid—		
Holland, 12 pgs.	W. C. Bacon & Co.	
France, 45	Webb, Warter, & Co.	
Holland, 31	Webb, Warter, & Co.	

Tallow—		
New Zealand, 171 cks.	Anning & Cobb	
" 31	Culverwell, Brooks, & Co.	
Belgium, 23 cks.	Sawer, Mead, & Co.	
Portugal, 8 cks.	Goad, Rigg, & Co.	

Tartar—		
Italy, 170 pgs.	Seager, White, & Co.	

Ultramarine—		
Holland, 9 cks.	Ohlenschlager Bros.	
U. S. A., 12 hds.	J. Melvin	
Germany, 20 cks.	Seaward Bros.	
" 27	H. Lambert	
" 4	R. Baelz	
" 11	Spies, Bros., & Co.	
" 2	Henderson, Craig, & Co.	

Holland, 45	Ross & Deering	
" 1	Keller & Co.	
France, 7 pgs.	Flageollet & Co.	
Holland, 6	Ohlenschlager Bros.	
" 7 cks.	R. Baelz & Co.	
Germany, 1	L. & I. D. Jt. Co.	
" 5	T. H. Lee	
France, 4	Flageollet & Co.	
Holland, 8 pgs.	Hernu, Peron, & Co.	
" 41 cs.	G. Steinhoff	
" 2	R. Baelz & Co.	
" 37	Spies, Bros., & Co.	

Varnish—		
U. S. A., 15 brls.	J. Stutchbury & Sons	

Wood Pulp—		
Sweden, 81 pgs.	M. Dk. Co.	
Norway, 32	F. E. Foulger	
" 160	Howell & Co.	
Sweden, 41	M. Dk. Co.	
" 81	A. Arfurdson	
" 200	J. Dickinson & Co.	
" 68	C. S. Lovell	
" 164	Taylor, Sommerville, & Co.	
Norway, 240	" H. Seiger	
Germany, 500	W. Balchin	
" 122	Tough & Henderson	

White Lead—		
France, 9 cks.	Beresford & Co.	
Belgium, 20	E. & G. Hirsch & Co.	
Germany, 40	T. & W. Farmiloe	
" 107	Randall Bros.	
" 8	Elkan & Co.	
" 10	Petri Bros.	
France, 21	Harrison & Co.	
Germany, 19	D. Storer & Sons	
Belgium, 59	T. & W. Farmiloe	
" 7	Leach & Co.	
Holland, 36	A. & M. Zimmermann	

Wax—		
France, 31 brls.	S. Frankenstein & Co.	
Morocco, 9 cks.	A. Afriat	
Germany, 6 brls.	M. D. Co.	
" 50	H. Birdseye & Co.	
France, 1	Keibel, Son, & Co.	
Germany, 4 pgs.	L. & I. D. Jt. Co.	
" 17	Grosscurth & Luboldt	
Holland, 10	J. Hall, jun. & Co.	
" 29 brls.	Perkins & Homer	

Zinc Oxide—		
Germany, 82 cks.	M. Ashby	
" 100	J. Matton	
" 3	L. & I. D. Jt. Co.	
" 9	T. H. Lee	
" 5	G. Steinhoff	
E. Indies, 1 cs.	L. & I. D. Jt. Co.	
Holland, 5	G. Rahn & Co.	

HULL.

Week ending Feb. 14th.

Alkali—		
Dunkirk, 22 drms.	Wilson, Sons, & Co.	

Alumina—		
Rotterdam, 40 cks.	W. & C. L. Ringrose	

Aluminium—		
Antwerp, 1 cs.	Bailey & Leatham	

Albumen—

Hamburg, 14 cks.	Furley & Co.	
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Alum Earth—		
Hamburg, 10 cks.	Bailey & Leatham	

Barytes—		
Bremen, 23 brls.	Tudor & Sons	
Rotterdam, 37 brls.	T. W. Flint & Co.	

Brimstone—		
Catania, 127 bgs.	128 ckt.	

Bone Meal—		
Bombay, 5,757 bgs.		

Camphor—		
Hamburg, 2 cks	Wilson, Sons, & Co.	

Chemicals (otherwise undescribed)—		
Hamburg, 278 pgs.	Wilson, Sons, & Co.	

Chemicals—		
Christiania, 12 cks	Wilson, Sons, & Co.	
Dunkirk, 43	"	
Rotterdam, 4	Geo. Lawson & Sons	

Stettin, 23 cks.	Wilson, Sons, & Co.	
Danzig, 4	"	
Bari, 20	"	
Bremen, 6	4 cs. Veltmann & Co.	
" 1	J. Pyefinch & Co.	

Copperas—		
Bremen, 22 cks.		

Caoutchouc—		
Hamburg, 3 cs.	C. M. Lofthouse & Co.	

Dyestuffs—		
Alizarine		
Rotterdam, 15 cks.	W. & C. L. Ringrose	
Rotterdam, 26 cks.	Hutchinson & Son	
" 43	3 cs. W. & C. L. Ringrose	

Dyewood		
Hamburg, 1 ck.	50 bgs. Wilson, Sons, & Co.	

Dyestuffs (otherwise undescribed)		
Palermo, 400 bgs.	Wilson, Sons, & Co.	

Extracts		
Rouen, 42 cks.	Rawson & Robinson	
" 40	Wilson, Sons, & Co.	
Fiume, 750 brls.	"	
Dunkirk, 55 cks.	"	
Fiume, 912	"	

Madder		
Rotterdam, 6 cks.	Hutchinson & Son	

Myrabolams		
Bombay, 8 463 bgs.		

Sumas		
Fiume, 20 bgs.	Wilson, Sons, & Co.	
Palermo, 5 bls.	"	
" 300 bgs.	"	
" 800	"	

Tannin		
Rotterdam, 20 cks.	Hutchinson & Son	

Valonia		
Smyrna, 100 bgs.		

Drugs—		
Bergen, 10 pkgs.	Wilson, Sons, & Co.	
Trieste, 13	"	
Venice, 2 cs.	"	

Farina—		
Harlingen, 1,020 bgs.		
Hamburg, 10		
Stettin, 560	Wilson, Sons, & Co.	
Danzig, 695	"	

Glycerine—		
Amsterdam, 21 pkgs.	W. & C. L. Ringrose	
Hamburg, 3 crbys.	1 drum.	

Glue—		
Rouen, 21 cks.	Rawson & Robinson	

Glucose—		
Stettin, 100 bgs.	Wilson, Sons, & Co.	
" 1,450	"	

Horns—		
Amsterdam, 235 bgs.	Dumoulin & Goaschalk	

Manure—		
Ghent, 340 t.	Wilson, Sons, & Co.	

Mastic—		
Copenhagen, 1 ck.	"	

Naphthol—		
Hamburg, 1 ck.		
Rotterdam, 20 brls.	Hutchinson & Son	

Naphthylamine—		
Rotterdam, 1 brl.	Hutchinson & Son	

Potash—		
Dunkirk, 20 drms.	Wilson, Sons, & Co.	
" 60	"	

Pitch—		
Dunkirk, 28 cks.	"	

Sodium Nitrate—		
Rotterdam, 3 brls.	"	

Tar—		
Dunkirk, 5 cs.	"	

TYNE.

Week ending Feb. 14th.

Alum Earth—		
Hamburg, 19 cks.	Tyne S.S. Co.	

Cryolite—		
Copenhagen, 5 cks.		

Calined Spar—		
Rotterdam, 100 bgs.	Tyne S.S. Co.	

Copper Precipitate—		
Huelva, 954 bgs.	Bede Metal and Chemical Co.	

Glycerine—		
Hamburg, 1 cs.	Tyne S.S. Co.	

Glue—		
Rotterdam, 20 bksks.	"	

Limespar—		
Rotterdam, 250 bgs.	"	

Saltpetre—		
Hamburg, 207 t.	"	

Waste Salt—		
Hamburg, 200 tons.	Clephans & Wiens	

LIVERPOOL		
Week ending Feb. 13th.		

Acetate of Lime—		
St. Nazaire, 60 sks.		

Acetic Acid—		
Ghent, 1 csk.	T. Fletcher & Co.	

New York, 25 brls.	E. M. Duche & Son
" 200	
Hamburg, 104 cks.	
Philadelphia, 218 brls.	
Glycerine —	
Venice, 20 cks.	
Blue —	
Hamburg, 49 brls.	
Horns —	
Galveston, 29 sks.	
Mercury —	
Havre, 2 pgs.	Cunard S.S. Co. Limited
Manganese Ore —	
Odessa, 20 tons.	
Manganese —	
St. Jago de Cuba, 35 brls.	T. Nickels & Co.
Ochre —	
Rouen, 85 cks.	Co-op. W'sale Society, Limited
Petroleum —	
New York, 8,955 brls.	
Pitch —	
Bordeaux, 50 cks.	
Potassium Prussiate —	
Hamburg, 2 casks.	
Plumbago —	
Genoa, 80 bgs.	
Potash —	
Rouen, 24 cks 21 drms.	Co-op. W'sale Society, Limited
Phosphate —	
Ghent, 1,640 bgs.	
Red Lead —	
Rotterdam, 47 cks.	
Sap —	
Malta, 1 bag.	E. Mahum
Saltpetre —	
Hamburg, 99 cks.	
Sapstone —	
Bordeaux, 200 sacks.	G. G. Blackwell
Sodium Acetate —	
Rouen, 9 cks.	Co-op. W'sale Society, Limited

Tartar Emetic —	
Hamburg, 8 cks.	
Tartar —	
Bordeaux, 7 cs.	
Ultramarine —	
Trieste, 30 cs.	
Verdigris —	
Bordeaux, 5 cs.	
Yalonia —	
Smyrna, 40 bgs	Essayam Shahum
White Lead —	
Rotterdam, 4 cks.	
Wax —	
Philadelphia, 100 brls.	
Zinc Oxide —	
Antwerp, 125 brls.	

GOOLE.

Week ending Feb. 14th.

Alum —	
Antwerp, 36 brls.	
Antimony —	
Boulogne, 8 cks.	
Caoutchouc —	
Boulogne, 5 cks.	
Dyestuffs —	
Boulogne, 93 cks.	
Glucose —	
Hamburg, 130 bgs.	
" 15 cks.	
Dunkirk, 180 bgs.	
Glue —	
Boulogne, 2 pgs.	
Muriate of Potash —	
Rotterdam, 8 cks.	
Ochre —	
Calais, 37 cks.	
Rouen, 112	
Potash —	
Dunkirk, 8 drums.	
" 22 cks.	
Calais, 9	

Potassium —	
Boulogne, 1 ck.	
Phosphates —	
Ghent, 1,600 bgs.	
Rosin —	
Brunswick (Ga.), 2,320 brls.	
Silicate of Soda —	
Rotterdam, 1 ck.	
Saltpetre —	
Hamburg, 6 brls.	
" 60 kgs.	
Antwerp, 85 bgs.	
Waste Salt —	
Hamburg, 1,073 bgs.	
Zinc Oxide —	
Antwerp, 10 brls.	

GRIMSBY.

Week ending February 8th.

Albumen —	
Hamburg, 11 pgs.	
Dieppe, 4 cs.	
Chemicals (otherwise undescribed)	
Hamburg, 16 pgs.	
" 4 cs.	
Dyestuffs —	
Rotterdam, 3 cks.	
Size —	
Rotterdam, 27 pgs.	
Zinc Ashes —	
Antwerp, 9 cks.	

GLASGOW.

Week ending Feb. 13th.

Alum —	
Rotterdam, 82 cks.	
Albumen —	
Antwerp, 6 cs. 2 crates	
Copper Ore —	
Huelva, 1,472 t.	Tharsis Co.

Dyestuffs —	
Alizarine	
Rotterdam, 63 cks.	
Indigo	
Calcutta, 33 chest	
Shellac	
Calcutta, 100 cases	
Sumac	
Marseilles, 150 cks.	
Extracts	
Bordeaux, 135 cks.	
Farina —	
Rotterdam, 390 brls.	
Glucose —	
New York, 50 brls.	
Rotterdam, 12 cks.	
Ochre —	
Bordeaux, 15 cks.	
Oxalic Acid —	
Christiania, 10 cks.	
Pitch —	
Antwerp, 11 cks.	
Painters' Colours —	
Antwerp, 62 cases	
Saltpetre —	
Calcutta, 1 box.	
Soda —	
New York, 7 cks.	
Stearine —	
Bordeaux, 50 bgs.	
Tar —	
Marseilles, 75 cks.	
Tartar —	
Lisbon, 8 cks.	
Bordeaux, 11	
Ultramarine —	
Rotterdam, 15 cs. 2	
White Lead —	
Antwerp, 3 casks.	
Wood Pulp —	
Christiania, 1,200 bls.	
Zinc Oxide —	
Antwerp, 75 cks.	

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.		Bisulphite of Lime—		B. Ayres, 10		Lyttleton, 10 kgs	
Week ending Feb. 8th.		Rangoon, 23 c.	£23	Hio, 18	497	Newcastle, 3 cwt.	
Lids (otherwise undescribed) —		Calcutta, 57	54	Mauritius, 2	9	E. London, 3 cs.	
Bombay, 1 cs.	£1	Borax —		8	34	Natal, 1	
Singapore, 15	11	Melbourne, 23 c.	35	M. London, 60 kg.	25	E. London, 1	
Am —		Natal, 2 kgs.	3	Calcutta, 2	5	Freemantle, 5	
Yama, 20 brls.	£18	Rio de Janeiro, 8 c.	12	Natal, 5 pgs.	14	Melbourne, 40 kgs.	
New York, 5 cks.	21	Lyttleton, 3	4	Colombo, 7	17	Adelaide, 20 cks.	
Asenic —		Melbourne, 5	8	Calcutta, 15 cks.	6	Gibraltar, 1	
Boston, 150 cs.	£218	Boracic Acid —		" 3	26	Napier, 2 kegs.	
Cam Cake —		New York, 1 cs.	£4	Madrid, 13	94	E. London, 7 cs.	
Bombay, 5 t. 7 cwt.	£25	Camphor —		Timaru, 3 fks.	24	Citric Acid —	
Calcutta, 150 cks.	101	Bombay, 2 cs.	£47	Brisbane, 34 pgs.	24	Hamburg, 2 kgs.	
Calcutta, 23 t. 15 cwt.	85	Carbolic Acid —		Durban, 12 cks.	21	Rotterdam, 3	
Ammonium Sulphate —		Yokohama, 5 cs.	£32	Halifax, 7	85	Hamburg, 1 ck.	
Hamburg, 20 tons.	£240	Cape Town, 1	19	Singapore, 2	20	Cape Town, 8 cwt.	
Cologne, 40	475	Shanghai, 1	55	Rio Janeiro, 5 kgs.	5	Cologne, 2 cks.	
Hamburg, 150	1,763	New York, 20	100	Mauritius, 2 cks.	5	Genoa, 7 kegs.	
Bombay, 10 t. 2 cwt.	70	Mauritius, 15	8	Melbourne, 1	8	Rotterdam, 1	
Dominica, 5 10	60	Yokohama, 30	75 drms.	Lisbon, 80 brls.	61	Boston, 2 cks.	
Demerara, 50 2	645	Caustic Soda —		Paris, 12	24	Carbolic Acid Cryst.	
Marseilles, 40 11	475	Bourgas, 64 c.	£24	Cadiz, 2	8	New York, 20 drms.	
Ghent, 80 10	926	East London, 7	14	Valencia, 3	8	Chloride of Lime —	
" 1,000 bgs.	1,215	Townsville, 10 t. 1 c.	80	Port Natal, 10 pgs.	40	Gibraltar, 4 cks.	
Dunkirk, 10 tons.	115	Lyttleton, 10 t.	76	Adelaide, 12	76	Copperas —	
" 335 bgs.	365	Newcastle, 96	50	Madeira, 4 cks	24	Melbourne, 12 cks.	
Ammonia Liquid —		Natal, 8	18	Calcutta, 10 kgs.	57	Disinfecting Powder	
B. Ayres, 20 cs.	£36	Chemicals (otherwise undescribed)		Copper Sulphate —		Santos, 10 cwt.	
Bombay, 3	11	Durban, 3 t.	£25	B. Ayres, 10 cks.	£63	Disinfectants —	
Calcutta, 1	2	Singapore, 5 pg.	18	Odessa, 103 cwt.	124	Brisbane, 10 drms.	
Brisbane, 5 cks.	17	Odessa, 1 cs.	10	Varna, 9	10	Calcutta, 25 cks.	
Mauritius, 8	20	Whampoa, 3	6	Paris, 10 t. 1 cwt.	240	Fertilizer —	
Yokohama, 3	12	Shanghai, 3	3	Lisbon, 5 1	112	Baltimore, 400 b	
Calcutta, 1	22	Hong Kong, 1	3	Kurrachee, 36 cwt.	48	Guanco —	
Ammonium Muriate —		Barbadoes, 2	12	Freemantle, 40	49	Sydney, 25 t.	
Melbourne, 21 cwt.	£26	Belize, 10	73	Havre, 5 tons.	120	Adelaide, 25	
Auckland, 8 cks.	35	Bombay, 26	87	Barcelona, 10 3 cwt.	212	Trinidad, 80	
Ammonium Carbonate —		Monte Video, 5	30	ream Tartar —		Guadeloupe, 570	
Sydney, 2 cs.	£19			Canterbury, 5 cwt.	£32	Jersey, 98	
				E. London, 1	7	" 215	
				Hawkes' Bay, 2	14		

Glycerine—			Sodium Carbonate—			Bleaching Powder—			Carbolic Acid—		
Amsterdam,	22 drms.	271	Natal,	4 c.	£3	Antwerp,	20 cks.		Hamburg,	14 t. 28 c.	
Cologne,	17	408	Hawke's Bay,	3	4	Baltimore,	54		Rotterdam,	1 cks.	
Shanghai,	3 cks.	41	Sodium Hyposulphite—			Bombay,	28		Rouen,	4	
New York,	49 c.	102	Kurrachee,	2 cks.	£2	Boston,	232	86 cks.	Bombay,	2	
Sydney,	15 cks.	82	Soda Ash—			Calcutta,	75		Hamburg,	40	
Hypophosphites—			Bombay,	17 c.	£10	Ghent,	211		Carbon Bisulphide—		
New York,	15 cks.	£300	Sulphur—			New York,	500	100 bks.	Bahia,	1 cks.	
Magnesia—			Brisbane,	50 cks.	£46	Philadelphia,	253		Copperas—		
Buenos Ayres,	1 c.	£28	Lisbon,	20 brls.	16	Santos,	5		Alexandria,	100 brls.	
Foochow,	1 c.	2	Salteake—			Calcutta,	55	80	Portland,	123	
Monte Video,	4	22	Antwerp,	140 t.	£250	Genoa,	349		Alexandria,	40	
Rio Janeiro,	10	29	Superphosphate—			Naples,	36		Syria,	30	
Melbourne,	20	25	Mauritius,	126 t.	£670	New York,	60		Copper Sulphate—		
Manure—			Harlingen,	514 bgs.	£700	Oporto,	59		Barcelona,	39 cks.	
Rotterdam,	1,663 bgs.	£1,000	Soda Crystals—			Philadelphia,	41		Genoa,	8	
Cullera,	510 t. 13 c.	4 221	Newcastle,	4 t. 18 c.	£16	Portland, M.,	100 brls. 35 brs. 32 pgs.		"	47 brls.	
Bordeaux,	80	359	Mauritius,	20 cks.	10	Rouen,	106 cks.		Rouen,	83	
Rocheport,	114	480	Sodium Nitrate—			San Francisco,	175		Barcelona,	82	
Charente,	23	123	Dominica,	8 bgs.	£10	Blood Albumen—			Genoa,	4 t. 19 c. 2 q.	
Cape Town,	20	110	Sugar of Lead—			Vera Cruz,	12 cks.	£102	"	26 19	
Canary Islands,	20	200	Calcutta,	10 kegs.	£13	Santos,	1	12	Havre,	5 3	
Mauritius,	19	9	Sodium Silicate—			Bone Manure—			Barcelona,	1 17	
Hamburg,	100	1,900	Townsville,	5 t. 3 cwt.	£20	Las Palmas,	100 bgs.	£12	Bordeaux,	10 7	
Ghent,	100	1,200	Newcastle,	20	7	Caustic Soda—			Amsterdam,	6 cks.	
Dominica,	27	12	Sheep Dip—			Boston,	400 drums.		Bilbao,	45	
Hamburg,	49	6	Freemantle,	36 pgs.	£18	Antwerp,	56 brls.		Valencia,	486	
Demerara,	40	105	Sulphide of Iron—			Genoa,	50		Bordeaux,	102	
Hamburg,	50	600	Martinique,	16 cwt.	£3	La Guayra,	10		Genoa,	40	103 brls.
Mauritius,	115	4	Strychnine Crystals—			Madras,	27		Bordeaux,	18	
Orotava,	100 bgs.	47	Adelaide,	2 cks.	£94	Manilla,	10		Seville,	2	
Dunkirk,	50	600	Tannic Acid—			Melbourne,	18		Tarragona,	50	
Bordeaux,	47	185	Mauritius,	1 cks.	£3	Messina,	50		Vigo,	8	
Rouen,	91	400	Madeira,	1 cks.	2	New York,	980		Palermo,	31	
Havre,	24	100	Tartaric Acid—			Rio Grande do Sul,	25 drums.		Genoa,	28 cks.	
Jersey,	29	900	Hawke's Bay,	2 cwt.	£10	San Francisco,	50 drums.		Barcelona,	15	
Nitric Acid—			Newcastle,	10	80	Tampico,	200 kgs.		Bilbao,	12	
Sydney,	8 cks.	£15	Natal,	1 cks.	15	Terneuzen,	35 drums.		Nantes,	41	
Phosphorus—			Mauritius,	1 cks.	15	Yokohama,	100		Bordeaux,	216	
Santa Cruz,	3 cwt.	£21	Lyttleton,	2	21	Alcanta,	14		Tarragona,	37 brls.	
Hioho,	27	398	Sydney,	21 cks.	110	Amsterdam,	10		Constantinople,	5	
Yokohama,	14	212	Kurrachee,	2	16	Antwerp,	33	26 brls.	Genoa,	71	
Kobe,	2 cks.	26	Madras,	2	14	Barcelona,	96		Ancona,	118	
Hong Kong,	2	37	Canterbury,	5 cwt.	44	Bilbao,	40		Portland,	19	
Potash—			Bombay,	6 cases.	44	Boston,	200		Trieste,	22	
B. Ayres,	33 pgs.	£27	LIVERPOOL.			Calcutta,	106		Bordeaux,	397	
Santos,	5 cwt.	21	<i>Week ending Feb. 15th.</i>			Canada,	150		Citric Acid—		
Potassium Chlorate—			Antimony Regulus—			Cartagena, S.	50		Corum,	6 brls.	
Hioho,	150 kgs.	£291	Bordeaux,	2 cks.	£67	" U.S.C.	8		Drugs—		
Yokohama,	100	192	Bordeaux,	1 t.		Ceara,	12		Colon,	5 cks.	
Potassium Acetate—			Alum—			Cienfuegos,	60		Constantinople,	1	
Hioho,	5 cks.	£20	Constantinople,	40 cks.	£31	Corintho,	35	15 cks.	Corinto,	7	
Potassium Cyanide—			Galatz,	5	11	East London,	15		Kingston,	6 cks.	
B. Ayres,	6 cks.	£15	Melbourne,	50 kegs.	12	Genoa,	168		Monte Video,	1 brl.	
Shanghai,	7 pgs.	29	Santander,	25 brls.	25	Malaga,	70		New York,	10 cks.	
New York,	12 cwt.	44	Sydney,	15 kegs.	4	Malta,	75		Oporto,	20	
Potassium Bromide—			Taleahuano,	10	5	Maracaibo,	10		Port Elizabeth,	1	
Melbourne,	1 cks.	£8	Bari,	4	5	Maranham,	15		Portland,	1 cks. 1 kg.	
Potassium Sulphate—			Santos,	1 t. 1 q.	£8	New York,	380	5 bxs.	Savanilla,	16 pgs.	
Mauritius,	95 cks.	£315	Acids—			Philadelphia,	216		Sierra Leone,	5 cks.	
Potassium Bichromate—			Santos,	50 cks.	£75	Portland, M.,	20	10	Trinidad,	2	
Hong Kong,	7 kegs.	£16	Antimony—			Rio Janeiro,	5	2 brls.	Dyes—		
Bombay,	16 cwt.	45	N. York,	100 kegs.	£80	Rotterdam,	95		New York,	2 cks.	
Quinine Sulphate—			Bombay,	1 cks.	38	Rouen,	120		Vera Cruz,	3	
New York,	20 cks.	£1,184	Halifax,	1		San Francisco,	100		Cape Town,	5 pgs.	
Sodium Bicarbonate—			Acetic Acid—			Santander,	3		Dunedin,	6 cks.	
Sydney,	20 cwt.	£7	Santos,	1 cks.	£5	Seville,	120	50	New York,	20 kgs.	
Bombay,	10	3	Acetate of Iron—			Syria,	10	10 cks.	Santos,	3 cks.	
Sulphuric Acid—			Santos,	1 cks.	£5	Trieste,	10		Dried Blood—		
Madeira,	5 drms.	£6	Ammonium Nitrate—			Trinidad,	7		Halifax,	7 bgs.	
Natal,	15 c.	£7	Calcutta,	5 cks.	£20	Venice,	15	10 cks.	La Palmas,	30	
Trinidad,	1	5	Cartagena,	22	47	Vigo,	10 cks.		Grand Canary,	19	
Calcutta,	4	5	Ammonium Muriate—			Caoutchouc—			Disinfectants—		
Algoa Bay,	25	18	Philadelphia,	45 cks.	£551	Savanilla,	5 bls.		Alexandria,	10 cks.	
Soda—			Ammonium Carbonate—			Valparaiso,	4 cks.		Sierra Leone,	4	
Monte Video,	13 c.	£3	Genoa,	10 kegs.	£21	Yokohama,	2		Epsom Salts—		
Salammoniac—			Rouen,	3 brls.	11	Cement—			Rio Janeiro,	50 kgs.	
Varna,	2 cks.	£10	Toronto,	5 cks.	43	Akassa,	21 t.		Glauber's Salts—	40 kgs.	
Constantinople,	15	49	Barcelona,	20	34	Curacao,	25 brls.		Rio Janeiro,	40 kgs.	
Bourgas,	12	43	Ammonium Sulphate—			Iquique,	6 cks.		Guano—		
Casa Blanca,	1 brl.	4	Hamburg,	1,171 bgs.	£1,488	Manaos,	50 brls.		Valencia,	243 t.	
Port Natal,	4 fms.	56	Ghent,	50	61	St. Thomas,	45 t.		Magnesia—		
Kurrachee,	32 c.	56	Las Palmas,	115	117	Chemicals (otherwise undescribed)			Antwerp,	12 pgs.	
Lisbon,	2 kgs.	5	Genoa,	665	840	Dunkirk,	23 brls.		Manure—		
Saltpetre—			Grand Canary,	20	25	Genoa,	56	2 cks.	Rouen,	55 t. 7 cwt.	
Amsterdam,	50 cks.	£210	Valencia,	516 bgs.	580	Iquique,	88 brls.		Bordeaux,	445 13 3 q.	
Leghorn,	55 c.	59	Aniline Colours—			Nantes,	348		Genoa,	117 14 2	
Rio Grande,	20	23	Bombay,	2 pgs.		New York,	4 cks.	£28	St. Nazaire,	139 8 1	
Monte Video,	22	24	Ammonia Salts—			Boston,	16 cks.	245	Havre,	157 12 1	
Rotterdam,	20	22	Porto Alegre,	1 cks.		San Francisco,	10 klms.	25	La Palmas,	20	
Natal,	5	6	Borax—			Cobalt Oxide—			Rochefort,	517 5 3	
Newcastle,	30	33	Havana,	19 brls.		New York,	5 cks.		Magnesium Chloride—		
Melbourne,	25	27	Nantes,	40		Antwerp,	1		N. York,	25 drms.	
Dominica,	5 t.	3	Matanzas,	2 cks.	£23	Caustic Potash—			Ochre—		
Lyttleton,	25 kgs.	42	Coruna,	1	9	Portland,	10 drms.	£11	N. York,	50 cks.	
Gothenburg,	16 cks.	42	Cadiz,	2	14	Carbolic Acid Crystals—			Oxide of Iron—		
Sydney,	40 kegs.	46							Gijon,	4 cks.	
Sulphate of Soda—									Antwerp,	13	
Ghent,	100 t.	£100							Oxalic Acid—		
									Marseilles,	6 cks.	
									Paint—		
									Bahia Blanca,	15 cks.	
									Madras,	1 cks. 7 drms.	

Nassau,	6 kgs.	
New York,	2	
Panama,	17 cks.	
St. Croix,	4	
Savannah,	4	
Vera Cruz,	3	
Potash Salts—		
Portland,	4 cks.	
Pitch—		
Akassa,	6 brls.	
Leghorn,	200 t.	
Valparaiso,	10	
Potassium Chlorate—		
Hamburg,	70 kgs.	£151
Boston,	100	211
N. York, 10 t.		440
Yokohama,	50	105
Philadelphia,	200	560
Coruna,	20	20
N. York,	100 4 brls.	210
Kobe,	25	160
Picric Acid—		
N. York,	20 cs.	£175
Rangoon,	20	88
Phosphorus—		
Penang,	5 cs.	£45
Potash—		
Alexandria,	2 brls.	£19
Venice,	3	17
Potassium Carbonate—		
Portland,	4 t. 16 c.	£76
Potassium Bichromate—		
Barcelona,	30 cks.	£388
Venice,	1 bx.	6
Bombay,	20 kgs.	38
Santos,	1 cs.	8
Ancona,	1 ck.	19
Quinine—		
New York,	30 cs.	
Salt—		
Antwerp,	210 t.	
Barbadoes,	100	
Boston,	200	
Brisbane,	100	
Buenos Ayres,	25	
Calcutta,	3,850	
Cameroons,	50	
Chicago,	199	
E. London,	17½	
Galveston,	72½	
Halifax,	510	
Hamburg,	50	
Hong Kong,	1¾	
Lagos,	20	
Manaos,	17	
Melbourne,	35	
Newcastle,	302½	
New York,	100	
New Orleans,	200	
Philadelphia,	50	
Rotterdam,	125	
Sydney,	50	
Trinidad,	19 8 c.	
San Francisco,	117	
Boston,	225	
Cameroons,	42½	
Christiania,	315	
East London,	9	
Grand Bassam,	10	
Malta,	5	
Santos,	4	
Wellington,	51¾	
Soda Ash—		
Baltimore,	288 tcs.	
Boston,	72 52 cks.	
Ghent,	8	
New York,	137	
Baltimore,	350	
Barcelona,	35 brls.	
Boston,	268 cks. 142 tcs. 500 bgs.	
Dunedin,	30 brls.	
Monte Video,	100 drms.	
New York,	106 tcs. 288 cks.	
Philadelphia,	197	
Rio Janeiro,	78 brls.	
Smyrna,	550	
Yokohama,	206	
Soda Crystals—		
Boston,	280 brls.	
Malaga,	12 cks.	
Philadelphia,	280	
Salonica,	25	
Boston,	140	
Calcutta,	24 cks.	
" "	34 kgs.	
New York,	747	
Philadelphia,	167 brls.	
Sodium Bicarbonate—		
Monte Video,	50 kgs.	2 cks.
Punta Arenas,	500	
Yokohama,	500	
Amsterdam,	35	
Antwerp,	36	
Genoa,	40	

Hamburg,	20 kegs	
Rio Janeiro,	2	
Rotterdam,	2 cks.	
lag—		
Nantes,	465¼ t.	
Sodium Silicate—		
Malaga,	10 cks.	
Salonica,	40	
San Sebastian,	16	
Spent Lyes—		
Rouen,	43 dms.	
Saltcake—		
Canada,	63 cks.	£126
Baltimore,	321	478
Philadelphia,	54 tcs.	79
Saltpetre—		
Cartagena,	80 bgs.	£115
Piræus,	50 brls.	162
Pernambuco,	50 cks.	64
Salammoniac—		
Genoa,	2 cks.	£16
Alexandria,	4 brls.	15
Philadelphia,	20	347
Alexandria,	8	40
" "	10	33
Samsoun,	2	14
Sodium Biorate—		
Coquimbo,	1 brl.	£8
Portland, M.	30	143
Rotterdam,	10 cks.	158
" "	1	46
New York,	15	16
Sheep Wash—		
Galveston,	10 cs.	£20
Algoa Bay,	3 t.	117
B. Ayres,	2	25
Brisbane,	10	26
B. Ayres,	50 4 c.	1,125
S. Francisco,	30 cs.	36
Algoa Bay,	150 drms.	35
Sodium Nitrate—		
Shanghai,	5 t. 1 c. 1 q.	£45
Leghorn,	9	85
Portland,	1 4	10
Cartagena,	4 10 1	43
Las Palmas,	7 1	78
Bari,	2 1 3	18
Passages,	5 18 1	62
Superphosphate—		
Hamburg,	772 bgs.	£1,711
Las Palmas,	90	36
" "	50	14
Sodium Arsenate—		
Lisbon,	14 cks.	£70
Sulphur—		
Rouen,	80 bgs.	£43
Toronto,	25 brls.	15
Boston,	667 bgs.	450
N. York,	334	220
San Juan,	10 brls.	87
Boston,	134	180
" "	267	
Tar—		
Akassa,	33 brls.	
Galveston,	8 cs.	
Madras,	37	
Ambriz,	10	
Manos,	10	
Rio Janeiro,	50	
Sierra Leone,	30	
Tannic Acid—		
Santos,	1 kg.	£6
Coruna,	6 brls.	43
Yarnish—		
Bahia Blanca,	10 dms.	
Waste Salt—		
Portland,	80 t.	
Porte Natal,	45	
Salt Pond,	27	
San Francisco,	799½	
Para,	124 8 c.	
Sulymah,	15 12	
Wellington,	125	
Zinc Chloride—		
Bombay,	2 cks.	£8

TYNE.

Week ending Feb. 14th.

Anthracene—		
Rotterdam,	248 c.	
Alkali—		
Rotterdam,	150 c.	
Trieste,	207	
Gothenburg,	50	
Ammonium Sulphate—		
Rotterdam,	70 t.	
Hamburg,	1,905 c.	
Bleaching Powder—		
Copenhagen,	1,324 c.	
Bergen,	106	

Rotterdam,	788	
Aarhus,	1,237	
Hamburg,	1,267	
Antwerp,	3,560	
Caustic Soda—		
Copenhagen,	620 c.	
Hamburg,	613	
Antwerp,	1,800	
Cement—		
Copenhagen,	80 c.	
Rotterdam,	44 t. 6	
Huelva,	357	
Copperas—		
Alexandria,	418 c.	
Litharge—		
Hamburg,	58 c.	
Copenhagen,	5	
Magnesia—		
Hamburg,	6 c.	
Red Lead—		
Copenhagen,	78 c.	
Rotterdam,	1 t. 2	
Hamburg,	207	
Soda—		
Rotterdam,	143 c.	
Copenhagen,	538	
Esbjerg,	552	
Odense,	119	
Malmo,	107	
Randers,	192	
Sodium Chlorate—		
Rotterdam,	1 t. 2 c.	
Salammoniac—		
Copenhagen,	101 c.	
Sodium Hyposulphite—		
Helsingborg,	100 c.	
Tar—		
Hamburg,	20 t.	
White Lead—		
Hamburg,	4 c.	
Copenhagen,	54	

HULL.

Week ending Feb. 14th.

Alkali—		
Odessa,	23 cks.	
Bleaching Powder—		
Bremen,	15 cks. 20 kgs.	
Gothenburg,	2	
Odessa,	23	
Bone Size—		
Harlingen,	13 cks.	
Benzole—		
Hamburg,	16 drms.	
Caustic Soda—		
Fiume,	4 drms.	
Cement—		
Amsterdam,	5 bgs.	
Copenhagen,	8 cs.	
Chemicals (otherwise undescribed)		
Antwerp,	31 cs. 25 pgs.	
Amsterdam,	3	27
Bremen,	2 cks.	42
Bergen,		
Constantinople,	1	
Christiania,		44
Copenhagen,	20	36
Dunkirk,		5
Gothenburg,	20	5 pgs.
Hamburg,	157	10
Konigsberg,		13
Libau,	1	20
Odessa,		388
Rotterdam,	30	37
Rouen,		8
Stavanger,	2	
Venice,		16
Dyestuffs (otherwise undescribed)		
Antwerp,	1 drms.	
Boston,	11 cks.	
Hamburg,	6 kgs.	7 cs.
Rotterdam,	2	4
Rouen,	3 cks.	
Horns—		
Hamburg,	51 bgs.	
Manure—		
Bremen,	51 t.	
Hamburg,	3,417 bgs.	
Ochre—		
San Francisco,	71 cks.	
Pitch—		
Antwerp,	233 t.	
St. Nazaire,	350	
Tar—		
Christiania,	5 cks.	
Copenhagen,	10	
Hamburg,	13	
Rotterdam,	3	
Stettin,	2	

GLASGOW.

Week ending

Ammonium Sulphate—		
Demerara,	53 t.	
Benzol—		
Rotterdam,	25 pgs.	
Bleaching Powder—		
Sydney,	7 t. 4½	
Boiler Coating—		
Sydney,	10 t. 14	
Cement—		
Sydney,	2 t. 6 c.	
Coal Tar Residue—		
Baltimore,	4 t.	
Chemical Products—		
Boston,	13 c.	
Drugs—		
Jamaica,		
Logwood Extract—		
Halifax,		
Litharge—		
Buenos Ayres,	3 c.	
Manure—		
Demerara,	90 t.	
Oxalic Acid—		
Boston,	17½ c.	
Paraffin Wax—		
Sydney,	750 lbs.	
Painters' Colours—		
New York,	5 t. 5	
Potassium Ferriate—		
Rotterdam,	4 ck.	
Potassium Bichromate—		
Bombay,	2 t.	
Rotterdam,	35 cks.	
" "	12	
Boston,	318 c.	
Potassium Iodide—		
Boston,	1 c.	
Red Lead—		
Monte Video,	1 t.	
B. Ayres,		
Sodium Bichromate—		
Rotterdam,	1 ck.	
Turpentine—		
Boston,	257 gls.	
White Lead—		
Sydney,	3 t.	
Soda Ash—		
Baltimore,	1,706½	
Soda—		
New York,	5 t. 14	
Sodium Nitrate—		
Demerara,	82 c.	

GOOLAND.

Week ending

Benzol—		
Hamburg,	8 drms.	
Rotterdam,	68 cks.	
Chemicals (otherwise undescribed)		
Ghent,	2 cks.	
Rotterdam,	101	
Coal Products—		
Calais,	20 c	
Rotterdam,	55	
Copper Precipitate—		
Hamburg,	200 bgs.	
Dyestuffs (otherwise undescribed)		
Ghent,	100 drms.	
Rotterdam,	20 ck	
Manure—		
Boulogne,	114 bgs.	
Ghent,	814	
Hamburg,	432	
Pitch—		
Antwerp,	324 t.	
Dunkirk,	392	
Tar—		
Ghent,	100 cs.	

GRIMSBY.

Week ending

Chemicals (otherwise undescribed)		
Dieppe,	62 cs.	
" "	9 cks.	
Rotterdam,	1	
" "	8 cs.	

PRICES CURRENT.

THURSDAY, FEBRUARY 20, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt	7/6	&	12/6
Glacial	..	2	10	0
Arsenic, S.G., 2000°	..	0	12	9
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	..	0	0	3¾
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
.. (Cylinder), 30° Tw.	..	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	..	0	0	1¾
Oxalic	nett	0	0	3¾
Picric	..	0	1	4½
Sulphuric (fuming 50 %)	per ton	15	10	0
.. (monohydrate)	..	5	10	0
.. (Pyrites, 168°)	..	3	2	6
.. (free from arsenic, 140/145°)	..	1	8	0
Sulphurous (solution)	..	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	..	0	1	2¾
Arsenic, white powdered	per ton	13	0	0
Alum (loose lump)	..	4	15	0
Alumina Sulphate (pure)	..	5	0	0
.. (medium qualities)	..	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 88° = 28°	per lb.	0	0	3
.. = 24°	..	0	0	1½
.. Carbonate	nett	0	0	3½
.. Muriate	per ton	23	15	0
.. (sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
.. Nitrate	per ton	40	0	0
.. Phosphate	per lb.	0	0	10½
.. Sulphate (grey), London	per ton	11	18	9
.. (grey), Hull	..	11	17	6
Aniline Oil (pure)	per lb.	0	0	11½
Aniline Salt	..	0	0	10
Antimony	per ton	75	0	0
.. (tartar emetic)	per lb.	0	1	1
.. (golden sulphide)	..	0	0	10
Barium Chloride	per ton	7	10	0
.. Carbonate (native)	..	3	15	0
.. Sulphate (native levigated)	..	45/-	&	75/-
Bleaching Powder, 35 %	..	5	10	0
.. Liquor, 7 %	..	2	10	0
Bisulphide of Carbon	..	12	15	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	0	0
China Clay (at Runcorn) in bulk	..	17/6	&	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	..	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	6
Benzol, 90 % nominal	per gallon	0	3	11
.. 50/90	..	0	3	0
Carbolic Acid (crystallised 35°)	per lb.	0	0	10
.. (crude 60°)	per gallon	0	2	10
Creosote (ordinary)	..	0	0	2½
.. (filtered for Lucigen light)	..	0	0	3
Crude Naphtha 30 % @ 120° C.	..	0	1	3
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	..	1	12	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	11
Coke-oven Oils (crude)	..	0	0	2½
Copper (Chili Bars)	per ton	47	17	6
.. Sulphate	..	26	10	0
.. Oxide (copper scales)	..	52	0	0
Glycerine (crude)	..	30	0	0
.. (distilled S.G. 1250°)	..	55	0	0
Iodine	nett, per oz.	8d.	&	9d.
Iron Sulphate (copperas)	per ton	1	10	0
.. Sulphide (antimony slag)	..	2	0	0
Lead (sheet) for cash	..	14	15	0
.. Litharge Flake (ex ship)	..	17	0	0
.. Acetate (white	..	23	5	0
.. (brown	..	19	0	0
.. Carbonate (white lead) pure	..	19	0	0
.. Nitrate	..	22	5	0

Lime, Acetate (brown)		£	s.	d.
.. (grey)	per ton	14	0	0
Magnesium (ribbon and wire)	per oz.	0	2	3
.. Chloride (ex ship)	per ton	2	6	3
.. Carbonate	per cwt.	1	7	6
.. Hydrate	..	0	10	0
.. Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	..	18	0	0
.. Borate (1st and 2nd)	per cwt.	60/-	&	42/6
.. Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	..	0	3	11
.. Miscible, 60° O.P.	..	0	4	6
Oils:—				
Cotton-seed	per ton	22	0	0
Linseed	..	23	0	0
Lubricating, Scotch, 890°—895°	..	7	5	0
Petroleum, Russian	per gallon	0	0	5½
.. American	..	0	0	5½
Potassium (metal)	per oz.	0	3	10
.. Bichromate	per lb.	0	0	4
.. Carbonate, 90% (ex ship)	per ton	18	0	0
.. Chlorate	per lb.	0	0	4¾
.. Cyanide, 98%	..	0	2	0
.. Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
.. (Caustic Potash) 75/80 %	..	21	10	0
.. (Caustic Potash) 70/75 %	..	20	15	0
.. Nitrate (refined)	per cwt.	1	3	6
.. Permanganate	..	4	5	0
.. Prussiate Yellow	per lb.	0	0	10
.. Sulphate, 90 %	per ton	9	10	0
.. Muriate, 80 %	..	7	15	0
Silver (metal)	per oz.	0	3	7¾
.. Nitrate	..	0	2	5½
Sodium (metal)	per lb.	0	4	0
.. Carb. (refined Soda-ash) 48 %	per ton	5	10	0
.. (Caustic Soda-ash) 48 %	..	4	10	0
.. (Carb. Soda-ash) 48 %	..	4	15	0
.. (Carb. Soda-ash) 58 %	..	5	12	6
.. (Soda Crystals)	..	2	13	6
.. Acetate (ex-ship)	..	16	0	0
.. Arseniate, 45 %	..	10	0	0
.. Chlorate	per lb.	0	0	6¾
.. Borate (Borax)	nett, per ton.	29	10	0
.. Bichromate	per lb.	0	0	3
.. Hydrate (77 % Caustic Soda)	per ton.	10	10	0
.. (74 % Caustic Soda)	..	10	0	0
.. (70 % Caustic Soda)	..	8	17	6
.. (60 % Caustic Soda, white)	..	7	17	6
.. (60 % Caustic Soda, cream)	..	7	10	0
.. Bicarbonate	..	5	7	6
.. Hyposulphite	..	5	2	6
.. Manganate, 25%	..	8	10	0
.. Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	4½
.. Nitrite, 98 %	per ton	27	10	0
.. Phosphate	..	15	15	0
.. Prussiate	per lb.	0	0	7¾
.. Silicate (glass)	per ton	5	7	6
.. (liquid, 100° Tw.)	..	3	17	6
.. Stannate, 40 %	per cwt.	2	0	0
.. Sulphate (Salt-cake)	per ton.	1	12	6
.. (Glauber's Salts)	..	1	10	0
.. Sulphide	..	7	15	0
.. Sulphite	..	5	5	0
Strontium Hydrate, 98 %	..	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	8¾
.. Barium, 95 %	..	0	0	5½
.. Potassium	..	0	0	8
Sulphur (Flowers)	per ton.	6	15	0
.. (Roll Brimstone)	..	6	0	0
.. Brimstone: Best Quality	..	4	7	6
Superphosphate of Lime (26 %)	..	2	10	0
Tallow	..	25	10	0
Tin (English Ingots)	..	96	0	0
.. Crystals	per lb.	0	0	6¾
Zinc (Spelter)	per ton	23	0	0
.. Chloride (solution, 96° Tw.	..	6	0	0

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Notices.

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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Legal.

THE CARTVALE CHEMICAL WORKS' NUISANCE.

THE SHERIFF PRINCIPAL'S INTERLOCUTOR.

Sheriff-Principal Cheyne has issued his judgment against Sheriff-Substitute Steel's decision in the Allison, timber merchant, against Messrs. Campbell Chemical Works, in which pursuer sought interdict from carrying on their works so as to constitute a nuisance. The following is the Sheriff's interlocutor and note:—

PAISLEY.

The Sheriff, having at avizandum considered the appeal, affirms the interlocutor of the Sheriff appealed against, finds the defenders liable in ad scale 2, including a special debate fee of £5., and

NOTE.—The Sheriff-Substitute has gone so fully agreeing as I do with his conclusion and generally with very clear note appended to his interlocutor, I think it may be confined within the limits of a few sentences. I, on behalf of the defenders, that the Sheriff-Substitute sufficient weight on the fact that the pursuer's property is surrounded by public works of various descriptions, true that it is not specially dealt with in the note, to the Sheriff-Substitute, it should be said that he made dental remarks which show that he did not overlook ever, as it may, there can be no doubt on the authenticity mining whether the operations at a particular nuisance, locality is a circumstance, and an import be kept in view. When it is said that a man has air diffused over his property, fresh and free from that means only that he is entitled to air as fresh reasonably be expected in the locality, consistently and legitimate use of property, and accordingly to Lord Westbury in the case of *St. Helens Smelting Tipping*, 11 H. L. Cas. 642—"If a man lives in a locality subject himself to the consequences of those operations may be carried on in his immediate locality, which is necessary for trade and commerce, and also for the enjoyment and for the benefit of the inhabitants of the town at large." But while, as was remarked in the same case, not in such questions stand on extreme rights, as living in the town cannot expect complete amenity from smell, or noise, I apprehend that it is only the amount of which is necessarily produced by the legitimate trade of the neighbourhood, that a resident in a town is obliged to bear. In other words, I think it stands to reason that a man on the ground that the atmosphere of the locality is heavily charged with smoke or is so impure as to be throwing into the air of any impurities which there is of guarding against, and which materially increase and annoyance of the neighbouring proprietors doing so constitutes a nuisance against which the proprietor is entitled to be protected. In applying the present case, I have come, after a careful consideration of the evidence, to agree with the Sheriff-Substitute in that, while the defenders may occasionally have been the fault of Messrs. Robin and Houston, at some time prior to the commencement of these proceedings, offenders in the matter of black smoke, and that each of the scientific witnesses agree might have been, indeed it seems to have been successfully apparatus introduced into the works in the course of which, owing to the lowness of the chimneys in pursuer's property undoubtedly got, when the wind was in that direction, the full benefit, added, in a material degree, of the fort and annoyance of the pursuer and his family. The further complaints of the emission from the defenders of vapours and charcoal dust, which, he says, injure

1d shrubs in his garden, affected the health of his family, and interfered in various other ways with his comfortable enjoyment of his property. Now, I agree with the Sheriff-Substitute that it has not been shown that the vegetation of the garden has suffered from anything traceable to the defenders' works, and I confess that I am sceptical about the alleged injury to health, but on the other hand, I have no doubt that owing to the raising of this action, and indeed for some time after that date, charcoal dust did come at intervals, and sometimes in large quantities, into the pursuer's ground from the defendants' works, and that the pursuer was thereby subjected to considerable and sensible discomfort, and to that extent I hold this branch of the complaint to be established. There remains the allegation about the offensive smells, and as to this I am bound to say that if it had stood alone I would, looking to the fact that so far as I can discover, the first complaint on the subject was made in the petition, have been inclined to think that there was some exaggeration in the evidence, and that the grievance was not of such a serious nature as to require or justify the intervention of the Court. Still, the proof seems to establish that there does come from the defenders' works, either from the evaporators or from the 85 feet chimney into which the uncondensed gases are led, or from both, the smell which in certain states of the wind is perceptible on the pursuer's grounds and house, and is disagreeable to the members of his family, and though I attach comparatively little importance to this part of the case, I do not think that I can or ought to throw it altogether out of view. On the whole case, keeping in view what I gather to be the unanimous opinion of the scientific witnesses, that this particular business unless carefully conducted may rightly become a nuisance to the neighbourhood; and treating the question as a jury-question I am satisfied, as the Sheriff-Substitute who heard the evidence was, that the defenders' operations, as conducted at the date when this action was raised, were a nuisance to the pursuer, and if I am right in so holding, it seems to follow that the pursuer is entitled to the interdict which the Sheriff-Substitute has granted, notwithstanding that the improvements since introduced by the defenders into their works have gone far to remove, if they have not entirely removed, all reasonable ground of complaint. Indeed, in view of these improvements, one cannot but suspect that the only point of any real interest to either of the parties is now a question of expenses. (Intld.) J. C.

Agent for pursuer: Mr. John Abercrombie, writer, Moss-street.
Agent for defenders: Mr. Dugald D. Dickie, writer, High-street.

PENNSYLVANIA SALT MANUFACTURING COMPANY.

THE Pennsylvania Salt Manufacturing Company, manufacturing chemists and importers of kryolith, No. 115, Chestnut-street, Philadelphia, is one of the most substantial concerns in the United States. This representative and widely known company was chartered by the Legislature of Pennsylvania, September 25th, 1850, with ample capital. It was organised for the purpose of engaging in the manufacture of soda ash of commerce under the corporate name of the Pennsylvania Salt Manufacturing Co. This title was partially a misnomer, as the manufacture of salt was not the principal object of the organisers, but at that period there existed no law in the State under which a company could be incorporated for the production of chemicals. There was, however, a general manufacturing law containing a clause for the manufacture of salt and the products derivable therefrom, and under this clause the charter was issued, as soda is by a certain process a direct product from salt. The company's extensive works are located at Natrona, on the Pennsylvania railroad, about twenty-four miles from Pittsburgh. The property purchased by the company contains coal in unlimited abundance, and a plentiful supply of salt water is obtained upon sinking wells. The works are admirably equipped with the latest improved machinery, apparatus and appliances, necessary for the systematic and successful conduct of this important and steadily increasing industry. In their works, mines, and quarries 1,400 men are employed, who earn upwards of 700,000 dols. annually. The capital and surplus of the Pennsylvania Salt Manufacturing Co. now amounts to several millions of dollars. The company manufactures extensively sulphuric acid, soda ash, caustic soda, sal soda, bicarbonate of soda, saponifer or concentrated lye, Glauber salt, alum, copperas, chloride of calcium, nitric and muriatic acids, nitrate of lead, Epsom salts, and many other chemical compounds. In consequence of the great expense of the preparation of soda compounds by the old methods, the company, in 1864, directed its attention to the mineral "kryolith" which is composed of sodium, aluminum and fluorine. This mineral is found on the southwest coast of Greenland, and was first discovered by the Esquimaux. Nowhere else has it been found, except in small quantities at Miask, in the Ural Mountains, between Russia and Siberia. In Greenland it is a solid mass

600 feet long, 200 feet wide, and 100 feet deep. A fleet of the company's ice fortified vessels, built expressly for this trade, bring many thousands of tons of this kryolith annually to Philadelphia, whence it is shipped by rail to the works at Natrona. To describe the company's machinery and apparatus in detail, and the various operations, would require several columns. In short, the kryolith mills, calcining houses, leaching vats, buildings for carbonising and crystallisation, massive tanks holding 2,000 tons of soda each, immense agitators, cast iron kettles weighing eleven tons each, leaden chambers containing 3,000 tons of lead, platina stills costing over 100,000 dols., saw mills, box factories, forty steam engines, and twenty-nine boilers, &c., all these constitute only a part of the valuable and extensive apparatus utilised in these immense works. Upwards of 200,000 tons of freight are handled annually by this mammoth industry. A branch of the company's works are situated in Philadelphia, where over 1,500,000 dols. is invested. At these works acids, alum, and the famous Lewis lye are manufactured. This Lewis lye is powdered and perfumed, and packed in pound cans for family use, and it is extensively useful in the household. In the company's copper and refining works at Natrona, Rio Tinto or Spanish and native ores are utilised. Natrona copper is a miracle of purity, and the silver invariably tests 999 fine. It has always been the aim of this reliable company to produce its goods on a scale and at a cost, that would increase uniform excellence, as well as cheapness. All wares, chemicals, etc., that bear "Natrona," are always recognised and appreciated by the trade and public as standard productions, possessing all the qualities claimed for them by the manufacturers. These goods have no superiors in the home or foreign market, and the reputation of the company for liberal and just dealing would be prized by the oldest commercial houses of the world. The company's central office is at No. 115, Chestnut-street, Philadelphia. At its works the company has erected several hundred substantial brick buildings for the accommodation of its operators. There are likewise several school houses and churches, and great interest is taken by the officers to make the homes of the company's workmen pleasant and attractive. The existence of this grand industry in our midst, its struggles and successes are eminently suggestive. Under practical free trade, when the United States depended upon Great Britain for its supplies of alkali and alum, the cost to the consumer was from 200 to 300 per cent. greater than at the present day. The following gentlemen, who are widely and favourably known in financial and manufacturing circles for their enterprise, ability, and honourable methods, are the officers and directors, viz.: T. Armstrong, president; F. P. Steel, vice-president; A. M. Purvis, treasurer; R. Dale Benson, B. A. Knight, J. W. McAllister, J. S. Jenks and Thos. W. Sparks, directors; P. A. Bour, general manager; R. G. Ewer, superintendent of Natrona works; G. F. Bihn, superintendent of the Greenwich works; principal chemists, G. F. Bihn, Otto Luthy, and Robert Heerlein. In conclusion, we would observe that the prosperity of the Pennsylvania Salt Manufacturing Co. presents a forcible illustration of the material benefits arising from a federal policy affording protection to American industries, resulting in the development of the nation's wonderful resources, and in the creation of such great corporations as this one, thereby rendering the United States for ever independent of foreign manufacturers.

MESSRS. GRIMSHAW BROTHERS, LIMITED.—In our leader of last week we described this firm as exhibitors of indiarubber chemicals. This was an error, as their specialities are zinc compounds and sizing materials for cotton warps and piece goods.

ALUMINIUM DIRECT FROM CLAY.—Referring to the patented process of Julius Emmner, for extracting this metal direct from North Carolina clay, a correspondent suggests the suitability of certain Irish clays for this purpose. He quotes an analysis shewing:—

Alumina	46.64 %
Silica	40.26
Oxide of iron	3.00
Lime	2.81
Magnesia	traces.

FRENCH CHALK PENCILS.—A very useful novelty has been just brought out by Mr. G. G. Blackwell, of Liverpool, in the form of a pencil of French chalk. It is specially adapted for marking on iron, steel, and other like substances, and its convenient shape will no doubt cause it to come into very general use and give it a ready sale.

COAL EXPORTS.—The shipments of coal were very unsatisfactory last month. Most of our local ports, and all the Welsh ports, had decreases to record. In the total, the North-East ports sent out 105,000 tons less last month than a year ago; and the four ports in South Wales sent out 84,000 tons less. Higher prices are evidently greatly lessening the export coal trade—aided by the finer weather, which limits the home consumption.

Industrial Celebrities.

VI.

JOSIAS CHRISTOPHER GAMBLE.

DURING the last half century no name has been more constantly prominent amongst the public men of St. Helens than that of Gamble. Six times it has been associated with the mayoralty of that borough, five in the person of Colonel Gamble, and once in that of his eldest son; and in the present year his son-in-law bears the honours of that position.

When, in the year 1868, St. Helens was incorporated, Colonel Gamble was chosen its first Mayor, as for nearly a quarter of a century before that time he had, with indefatigable zeal, given his services to the town as a member of the Board of Commissioners; indeed, he was one of those who were instrumental in obtaining the first Local Improvement Act.

Very few towns in England have attained a position, in connection with the Volunteer movement, so distinguished as St. Helens, and this success is very largely owing to the support which Colonel Gamble gave to it from its inception in 1860. He was one of the most active members of the General Committee, who raised the funds for its first establishment, and which included all the leading men of the district; he was chosen the Captain of the first company that was enrolled, and as the regiment grew in strength and thereby became successively entitled to a Major and to a Lieutenant-Colonel, he was promoted to those ranks. By his generosity the excellent drill-hall and parade-ground were provided, and during the seven and twenty years that he was commanding officer of the battalion, its organization was perfect; the 47th Lancashire was distinguished for the soldierly bearing of its members on parade, for the admirable commissariat arrangements which drew official notice when a review was held distant from home, and in musketry it won not only the highest honours in its county competitions, but also carried off, in the great national contests at Wimbledon, numerous and valuable prizes, on one occasion bearing away the blue ribbon of victory, the Queen's Prize. In yachting circles, too, for many years Colonel Gamble has been a familiar figure, having been Commodore of the Royal Mersey Yacht Club for the past ten years. Having always resided almost within the precincts of the town, he has taken a constant and intimate interest in all its concerns, not merely discharging public duties, but also filling a social position, and thus assisting to arrest wretched deterioration which too often takes place in the towns devoted to manufacturing industries, especially when the processes are noxious, polluting the atmosphere and destroying the vegetation.

The bane of such places is that the swarming population of the labouring classes is left comparatively uncared for by its employers, who go to reside in more agreeable neighbourhoods, or who are only members of public companies who justify their gross neglect of social duties, by asserting that boards of directors have no right to be the dispensers of charity, and that their servants must not give their time or attention to public affairs.

The lamentable consequence of this vicious system is that such towns lack efficient local government, are not provided with those institutions and social arrangements which are essential to health, morality, and civilisation. Matthew Arnold once designated such towns "perfect hell-holes."

Colonel Gamble built his residence close to the town, and within an easy walk of his works; the scene of his labours has been constantly before him, and he has been keenly alive to the needs of the district: he has associated himself with every local movement, has spent his wealth among those who, to some extent, have contributed to its acquisition, and he has made a local residence, at least bearable if not attractive. It is not to be wondered at that his fellow-townsmen have been anxious to record their grateful appreciation of his services or that they rejoiced in the public honours which have been awarded him. But the local influence and the social position of the Gamble family to-day has not been reached by any royal road, it is the result of sixty years of patient plodding industry, and of great care and thrift; the extensive works of Gerard's Bridge and Hardshaw Brook are the results of slow and cautious development, not that there has been any lack of

enterprise or disregard of the progress of invention it was at Gerard's Bridge that the Weldon invention and every discovery in the manufacture of chemical noted, but no step forward has been rashly taken successful business is that it has been slow but sure. Josias Christopher Gamble, who was born in the year 1799, called Graan, near Enniskillen. The Gambles family, but were driven from Scotland, and took "when King James the Sixth thrust prelacy upon were staunch and steadfast Presbyterians, and chose conscience sake. The almost universal ambition of that one of their sons might be a scholar and a minister the lot of Josias Christopher Gamble; he was sent to University, but to Glasgow, where he studied and his degree of M.A. in 1797.

In December, 1799, he was ordained minister of Kirk in Enniskillen, and he continued to be the congregation for over four years, until February, 1804.

On leaving Enniskillen he accepted a "call" to Belfast.

In the present day missionaries, before proceeding to labour, frequently pass through a short course of and medicine, and no small portion of their time attending to the bodies as well as to the souls of men their gospel as being a message from "The

"health diseases" as "iniquities": so in the end it was customary for those who were being trained for the Presbyterian Church, to medical lectures. One Gamble attended at Glasgow presided over by Dr. C. chemistry. The student stirred by the enthusiasm of his teacher, and so fascinated in natural science, that long vacations in the studies and in making chemicals. His friends did not at his tasks had taken; when fumes he created, they heresy. But Gamble's those of a philosophical practical in his pursuits. neighbourhood in which upon their lands, and then spun it. Gamble understood he had acquired in his studies to prepare solutions of chemicals in linen which was manufactured by loom weavers.

William Gossage used the success of the Gambles was attributed to their personal efforts to use up every

Josias Christopher Gamble, even in his earliest operations bleaching solutions, did not overlook the importance of any waste; he used to work up the residues of chlorine, into Glauber's salts. These experimental indications and suggestions of the great commercial processes, and a vision of a Land of Promise opened in a lucrative and beneficent industry, so that when in Belfast he decided to resign his charge, and to found a mind, and, without wholly abandoning the sacredness of himself to the manufacture of chemicals as a business. After he had given up his church and had established business in Dublin, he used occasionally to officiate in the street Church in that city.

The process of the manufacture of bleaching solution of chlorine by slacked lime was patented by the grandfather of the present Sir Charles, in 1799, and he erected a small plant in County Monaghan to work Tennant had patented on the other side of the Channel the plant was, may be judged from the fact that the chambers consisted of half casks inverted over a lime; he had no sulphur, ovens or vitriol chambers acid he required he obtained from Tennants, of Glasgow.

Before the year 1815 the Monaghan Works were suitable premises, which Gamble built on the bank below Island Bridge and above Dublin, on land from Sir William Worthington, a Dublin merchant the house with extensive garden and grounds, works, and is at the present day occupied by Mr.



JOSIAS CHRISTOPHER GAMBLE.

began to make his own sulphuric acid, instead of getting it from St. Rollox; he claimed to be the first manufacturer who introduced into the United Kingdom what was known as the French plan of working vitriol chambers, that was, with a constant draught through them. When his plant was being altered to this plan, his anxiety to retain the secret of the arrangement, induced him with his own hands and during the night to do the necessary plumbing work himself. The articles he manufactured were Sulphuric Acid, Bleaching Powder, Alum, and Glauber's Salts, the last of which he continued to make up from his chlorine residues. The alum he made from pipe-clay which he imported from Poole, and potash obtained from what was known as sulphur ashes. These sulphur ashes were the residues left in the brimstone burners or ovens, into which brimstone mixed with nitrate of potash used to be cast; this work was done by small boys, who with iron spoons kept regularly throwing in the charge.

The process for the manufacture of Glauber's Salts from the residues of the chlorine stills, though little mentioned in chemical books, was carried out on an extensive scale nearly down to the year 1840, about which date Messrs. Thos. Bell and Son, of Newcastle-on-Tyne, prepared sulphate of soda for the alkali manufacture by this process. We believe they found it necessary to suspend the process during the summer, as the conversion of sulphate of manganese into sulphate of soda, did not take place except at a winter temperature. While Mr. Gamble was manufacturing chemicals in Ireland, both his raw products of what is now called the soda manufacture, viz.:—Brimstone, and common salt, were subject to heavy duties. A drawback on the brimstone consumed, was refunded upon the affidavit of the manufacturer; but the exciseman attended the chlorine stills as carefully as they did the stills for making spirits, and saw the salt weighed in and gave a certificate for a return of the duty. It would thus seem that the chemical manufacturer was not subject to the duty on salt, but there were other inconveniences when it was found the duty-paid salt lost far more by so-called drainage on its voyage from Northwich to Dublin, than it did afterwards when no duty had been paid upon it. In the former case it was worth stealing, and in the latter the temptation was not so great.

At the age of forty-four, during the time that he was in business in Dublin, Gamble married Hannah Gower, the daughter of a Dublin solicitor; to them were born one son and three daughters, the daughters are all deceased, one died in Dublin the other two in St. Helens. Mrs. Gamble only survived her husband five years, and on the 16th December, 1852, died at the residence of her brother, John Gower, of Roundwood Park, County Wicklow.

During Gamble's residence in Dublin he was acquainted with James Muspratt, who had, in partnership with a Mr. Abbott, also commenced the manufacture of chemicals in that city, but in 1822 Muspratt, having perceived that Dublin was less favourably situated for his business than Lancashire, left Ireland and came to England. In the year that the Salt Tax was repealed, 1823, he started his works in Liverpool; five years afterwards Gamble also came to England, leaving Dublin and coming to reside in Liverpool in the year 1828. Several months elapsed before he could make up his mind as to which was the best locality and site for an alkali works; for a time he was inclined to select a plot of land at the head of the Birkenhead Float, where a copper ore yard is now situated; his idea was that the brine should be conveyed thither by pipes from Northwich, a scheme similar to that which the Mersey Salt and Brine Company carried out nearly fifty years afterwards, when they established their works at Runcorn. After months of search and consideration, he decided to come to St. Helens, and in this enterprise he was joined by James Muspratt. They erected their works on the banks of the St. Helens Canal, close to the double locks, on the spot which is now occupied by the Globe Alkali Company's works. Gamble was seventeen years Muspratt's senior; they were both men of impetuous natures and strong wills; their partnership only lasted two years. Muspratt, in the year 1830, commenced his Newton works, and Gamble remained in sole possession of the St. Helens property; he carried on his operations for five years without any partner, but in 1835 a works situated near to his own came into the market; it consisted of five sulphuric acid chambers, two of which had never been worked, and a plant for making alum from the blue clay called "warrant," which was obtained from the coal-pits. These works were erected about the year 1830 by Edward Rawlinson, a blind solicitor, from the north of Lancashire; they were managed by a Mr. Williams, who, it is believed, was his brother-in-law. The business was a failure. A bankrupt chemical concern is invariably sold for very much less than its value; Gamble saw that a bargain was to be obtained, and he induced Joseph and James Crosfield, the soap-boilers, of Warrington, to join him in the purchase, which they completed on such terms that the works, after being stripped of the lead they contained, were held by them at a cost of about £400. The connection thus commenced led to the Crosfields becoming partners in Gamble's business in the year 1836, and in the following year Simon Crosfield, a younger brother, who was a tobacco manufacturer in Liverpool, also joined the firm, and under-

took the commercial and financial management of the business. The title of the firm was Gamble and Crosfields.

Gamble and Muspratt ran a great risk when they established their works at St. Helens, for the district at that time was a picture of rich fertility. Farmsteads, with their gardens and orchards, came right up to the streets of the small country town, the valleys were watered by brooks that had "here and there a lusty trout, and here and there a greyling" in their clear waters; game also was abundant; even after various works had begun to spring up, on wintry nights pheasants would venture to seek shelter from the blast, in the warm sheds that glowed with the light of furnaces. On one occasion, about the year 1845, a stag pursued by Sir John Gerard's hounds scampered into Gamble's works, and crashed into a pile of disused carboys. The chimneys of colliery engine-houses, and cones of glass-works rose amidst farm buildings and stacks of hay and corn. Cornfields, luxuriant hedgerows, and healthy though always stunted timber, for the soil was not congenial to its growth, adorned the landscape. Families that constituted the society of that day, had their comfortable halls, or commodious and well-built residences, with ample and highly-cultivated gardens.

The names of Greenall, Cross, Caldwell, Fildes, Speakman, Orrell, Robinson, Watson, Pilkington, Gaskell, Casey, Daglish, Bromilow, Keates, West, Fincham, Cotham, Morley, the three Johnsons, Grundy, Eckersley, Haddock, and others will recall many memories of those days; a vivid picture presents itself of the pleasant social life of which St. Helens was the scene, and many a tale is still told of the "marlocks" of the men who were then young and of the convivial gatherings of their fathers.

The Plate, Crown, Flint and Bottle Glass trades were all established in St. Helens when Gamble settled there, and the Crown glass makers soon after began to use sulphate of soda; the colliery proprietors welcomed a new trade which promised to increase very largely the demand for fuel; these interests lessened the opposition which would otherwise have been fatal to a manufacture which was associated with serious injury to vegetation, and which was suspected of being prejudicial to health. From the agricultural interest, the pioneers of alkali making encountered bitter opposition. The lawsuits brought against Muspratt by the Corporation of Liverpool, and the landowners of Newton are historical; at St. Helens, Gamble, Crosfield, Clough, Darcey, Kurtz, and Morley only avoided the harass of ceaseless and ruinous litigation by the liberal payment of compensation. That the acid vapour emitted from their works did very great damage was unquestionable, but to make a fair and just assessment of the amount of injury was no easy matter, and it is to be feared that frequently the manufacturers were subjected to extravagant and exorbitant demands, and that the loudest and least reasonable of the claimants often obtained the lion's share of the plunder. Some farmers found that harassing the chemical manufacturers paid them far better than good farming. Doubtless Gamble and Muspratt under-rated the risks they were running, and magnified the advantages of cheap fuel, ready transit, a good market, and abundant supplies of water, with convenient drainage.

How to condense the noxious and destructive gases, and take away the terrible tax which was being imposed upon them by the farmers, was a question of the first importance; and in the year 1836 William Gossage conferred an incalculable benefit on the alkali trade by the invention of his condensing towers. Gossage also patented one of his processes for the recovery of the sulphur from vat-waste, involving the using up the weak hydrochloric acid which was obtained, and which being produced from the open reverberatory furnace was too dilute to be employed in the decomposition of manganese in the production of chlorine. Gossage's plan was to place the green waste in layers on shelves in wooden stills, to run the weak muriatic acid over it, so causing sulphuretted hydrogen and carbonic acid to be given off, these mixed gases were passed through a further quantity of the waste placed on perforated shelves, such as are used in gas purifiers, and a further quantity of sulphuretted hydrogen was given off by the action of the carbonic acid. The sulphuretted hydrogen evolved in these operations, was burnt with an excess of air in an oven covered with a perforated arch, on which was placed a layer, several feet in depth, of broken bricks, and through these the sulphurous acid was passed into the ordinary vitriol chambers.

Joseph Crosfield, dismayed by the demands made upon their firm for damage to trees, hedges, and crops, insisted on the immediate adoption of Gossage's patents; to this Gamble was strongly opposed, as he believed some plans he had himself conceived, would supersede Gossage's inventions. Crosfield, however, was so impressed with the urgency of the situation, and the value of Gossage's work, that on his own responsibility, and in defiance of his partner's wishes, he concluded an agreement with Gossage to erect the necessary plant for them, and put his process into operation. Gamble was very indignant at his wishes being disregarded, and at a contract being made without his consent; a quarrel ensued between the partners, which was so serious that Joseph Crosfield never put his feet inside the works again. Notwithstanding this, the new process

was brought into operation, but the use of it was discontinued about a couple of years afterwards.

Simon Crosfield avoided being drawn into the dispute, and was always on the most friendly terms with Gamble, but the differences between the partners ended in a dissolution of the partnership in 1845, some years prior to which date Gamble had acquired the sole interest in the alum works at Gerard's Bridge. At these works he first had as a partner a Mr. Marsden, the firm being known as Gamble and Marsden, but within a few years it underwent changes, first to Jos. C. Gamble and Son, then to Gamble, Son, and Sinclair, and then back again to Jos. C. Gamble and Son, which it has retained till the present day, when it consists of Colonel Gamble, in partnership with his four sons, Josias, William, David, and George.

The patent which Mr. Gamble took out in 1839, and which he first put into operation at the Gerard's Bridge Works, claimed:—

First, iron retorts worked in connection with each other. Two decomposing furnaces are connected with a roasting furnace.

Second, the iron retorts constantly worked through a door, open or partly open while the process is going forward, the draft of the chimney drawing in a portion of the external air with the muriatic acid into the receivers. This claim was disclaimed in January, 1845, on the ground that the words have a doubtful meaning.

Third, the use of receivers so arranged that the acid can pass from one to the other or can be cut off at pleasure when strong acid is required; these are filled with glass or pebbles.

Fourth, the use of earthen stills with leaden heads, incased in iron heated by the circulation of hot water, saline solutions, or by steam.

Fifth, the mode of alternate charging of the lime receivers, by which lime already in part saturated with chlorine, is exposed to the strongest gas, and the remnant of gas is absorbed by a surface of fresh lime.

From this patent dated the introduction of the use of the "iron pot" in the decomposition of salt, which, with various modifications, has been continued up to the present day. But some manufacturers, though they adopted the apparatus so patented, maintained that its principle was not patentable, and after protracted litigation succeeded in releasing themselves from any legal liability to pay Gamble royalty for his invention, but Messrs. Tennants, of Glasgow, who produced probably three-fourths of all the bleaching powder then made in the United Kingdom, and who had bought Gamble's patent rights for the whole of Scotland, declined to avail themselves of this decision, and continued their annual payment for the whole term of 14 years, for which the patent was granted. Up to the time they bought Gamble's Scotch patent the Tennants worked the old method of making chlorine from salt, manganese, and sulphuric acid.

Advancing years and declining health told upon Gamble, and in the year 1841 he was compelled to obtain assistance in the superintendence of the works of Gamble and Crosfields. He selected James Shanks, a Scotch engineer, who was born at Johnstone, near Glasgow, and whom Gossage had brought to Lancashire to erect and superintend the plant of his various patent processes. James Shanks proved himself to be a most capable man, and when in the year 1845 the partnership between Gamble and the Crosfields was dissolved, the Crosfields retaining the business, James Shanks was made a partner in the new firm of Crosfield Bros. and Co., his department being the practical management of the works, whilst Simon Crosfield continued to direct its financial affairs. Shanks continued to be a partner as long as he lived, and his energetic and careful management largely contributed to the repute and success of his firm; not until sometime after Shanks' death, and after the retirement of Mr. John Brock, whom he had trained did Crosfield Bros., & Co. disappear from amongst the chemical manufacturers of Lancashire.

On the 4th December, 1844, Gamble took out a patent to utilise the heat generated in pyrites burners, his idea being to apply it to the concentration of sulphuric acid by passing the hot gas under leaden pans. It is curious to know that Andrew Kurtz applied for a patent for a similar purpose, passing the heat over instead of under the pans. After the final separation from the Crosfields had taken place, Josias Christopher Gamble, on account of declining health, took the world very quietly, visiting his works at Gerard's Bridge two or three times a week, often not getting off his pony during these visits. He was troubled by chronic bronchitis, and the acid gases inseparable from an alkali works were not bearable by him; his health was permanently impaired, and the anxiety which his lawsuits entailed told upon him very heavily, indeed, it may be said that the final struggle with Andrew Kurtz killed both these enterprising and energetic pioneers of the alkali trade. Both these men had to encounter difficulties of which the present generation has no conception, their business had raised up a host of enemies among the farmers who would have annihilated them if they could, trained and capable assistants were not to be obtained, the master had to train his men in every grade of service, new inventions multiplied themselves, and competitive jealousies brought about lamentable and destructive struggles for supremacy.

Gamble did not take opposition lightly; indolence, stupidity, and

neglect irritated him intensely, he threw himself h work, and he expected those in his employ to do

The striking feature in the life of Josias Chris contrast which his career presents to that of i present day. They start after having received a ing in their youth. Technology was an unknown petent technologist means a man who has a fair al natural science, he must know something of geol even botany. He must be a fair mechanic, an chemist, in addition to this he must be able to reac works in French and German, but in Gamble's e struction could be obtained, the manufacturer h knowledge of the science of his subject, he had to path and feel his way in dim uncertainty.

Another point of contrast is the facilities with any apparatus, however novel or complicated can matter what process is devised, that suitable promptly be manufactured is never suggested; pr or chemical action present no difficulties, the cl ready at once to make the way plain, but in Gamb be his own chemist, engineer, and architect. He l nature of his reactions, to devise his tests, to co design their construction; he had no trained dra he could entrust his plans, he had to do all this

The difficulties which he encountered may be illi in which he had to make his chlorine stills. They ware, in them was placed the ground manganese charge was kept continually agitated by a mecha kept hot by the circulation of hot water. Ther manufacturers of such vessels as Gamble required at take their construction himself. They were m being built up like pots used in making gla months to build and dry them before they co first made vessels of 100 gallons but afterwards h to 400 gallons. These earthenware stills were, o when unground manganese and live steam began

It was thus throughout his whole works, insignificant as thermometers and hydrometers, wh in his own laboratory, being an expert with the blc

But not only had he to devise and construc apparatus, he had also personally to instruct as w his workmen in each department. He never empl a chemist; if he wanted assistance he taught m required them to do.

Though Gamble loved his business he was n work. He was a great reader, both of scientifi with his business and of the current literatur learned French after he was married, probably of his wife, and could read French scientific v facility. Though his family never heard him spee his way in France when little of the English langi in French hotels.

Gamble, when he first came to St. Helens, resid Duke-street; he then took a farm and lived for seve house on the property which belonged to Sarah (extended from Raven-street to Pocket Nook. T Bishop's Bridge; the farm is now covered by the I Chemical Works, etc.

In the year 1839 he removed to Sutton House, a the close of his life.

He died at his residence, on the 27th Januar after the birth of his first grandson, and was in which his two daughters had been interred, Chapel, St. Helens.

Sutton House is now converted into the Cottage

Gamble's personal appearance was as remarka was original. He habitually wore black broac cravat, and his hat had a brim almost broad en The black cloth of his clothes was often bes showing numerous red spots. Although descende were adherents of the old-fashioned Toryism of l displayed pronounced Liberal opinions, and was of the body of United Irishmen; indeed, it is agitation burst out, he hid in his house some of th of that party.

He remained a steadfast and decided Liberal, Free-Trader, and a liberal supporter of the Anti He was an advanced Financial Reformer; he adv of all Customs Duties; and, indeed, of all ir much so, that he would have applied the Income even so low as twenty shillings per week, and have taxes.

The presentment which we have of him is not th theorist or an ingenious inventor, not that of a ma

days and nights in experimental research, but of one who was eminently practical, who sought to turn to useful and profitable account the knowledge he had acquired.

His University training did not unfit him for the concerns of manufactures and of commerce, and the benefits which his successors are conferring on the town in which he found his home, would indicate that the deep impressions of the work with which his own life opened are still being perpetuated in the characters and labours of his descendants.

The business was founded by courageous enterprise and self-reliance, was conducted in the face of difficulties and opposition which called forth great endurance and perseverance, and has been established, built up, and extended by unwearying industry and vigilant attention. On the qualities which this story reveals are founded the securities of permanent and increasing prosperity, and the benefits of individual success are ever enhanced when they are associated with devotion to the public weal.

ANALYSIS OF MARINE OILS.

BY RUSSELL W. MOORE, A.M., M.Sc.

IN connection with an extended examination of a large number of oils and fats, the results obtained in the case of some porpoise and blackfish oils were of so unusual a character as to deserve particular mention.

It has for some time been considered that the analysis of the various fats and oils occurring in nature would show a percentage of insoluble fatty acids amounting to some figure in the neighbourhood of 95 per cent. A notable exception is butter fat, in which the insoluble fatty acids range between 87.5 and 89.5%, and, in some cases, even slightly higher. The first chemical process used to distinguish butter from other fats was based solely upon this difference. Later, coconut oil was found to contain fatty acids soluble in large amounts of water, and sufficient washing was found to reduce the per cent. of insoluble fatty acids to a figure even lower than that given by butter. (*Chemical News*, December 5th, 1884.)

It must, however, be granted that while this opinion was founded on a very large number of analyses of butter, the number of such analyses made on other fats was extremely small when the great number and variety of fats and oils occurring in nature is taken into consideration. Oleomargarine, beef and mutton suet and lard, and a few oils, comprised nearly the whole list of fats analysed.

An examination, however, of most of the natural fats and oil serves to establish in most cases the fact that the insoluble fatty acids amount to about 95 per cent. A notable exception is found in the case of some marine oils examined by the writer.

The oils in question are known in the market as porpoise jaw and blackfish jaw oils, and are obtained from the soft fat of the head and jaw by allowing the oil to exude from the fat. The oil thus obtained is exposed to cold, and the portion remaining fluid is racked off. The resulting oil, carefully skimmed and strained, is of a straw yellow colour, thin and limpid, and by no means of an unpleasant odour. It is used for lubricating fine machinery and commands a very high price.

The oils examined were five in number, as follows:—

- No. 1. Porpoise jaw oil skimmed and strained.
- No. 2. Porpoise jaw oil skimmed and strained.
- No. 3. Porpoise jaw oil not skimmed and strained.
- No. 4. Blackfish jaw oil skimmed and strained.
- No. 5. Blackfish body oil.

The oils were first examined by the wash process to determine the percentages of soluble and insoluble fatty acids. The results were as follows, the figures given being the mean of duplicates agreeing closely.

	Soluble Fatty Acids.	Insoluble Fatty Acids.
No 1.	17.18%	72.05%
No. 2.	21.44	68.41
No 3.		96.50
No. 4.	21.79	66.28
No. 5.	2.46	93.07

The oils were next examined by the Reichert process with the modification suggested at the time by Dr. Waller. The distillation was continued by adding 50 c.c. of water to the flask and distilling until a practically neutral distillate was obtained, adding 50 c.c. of water between distillations, titrating as in the Reichert process and calculating the acidity to butyric acid.

The results obtained were as follows:—

	Reichert Figure.	Total Acidity.
No. 1	47.77 c.c.	17.18%
No. 2	56.00	20.97
No. 3	2.08	1.42
No. 4	65.92	24.31
No. 5	5.60	2.34

The saponification number was obtained by the process of Koettstorfer. Considerable difficulty was experienced in this determination in obtaining concordant results, since the combination of the alkali with the fat appeared so feeble that even very dilute standard hydrochloric acid appeared to decompose the soap and liberate fatty acids. This was seen on diluting with water, when oily drops would appear while the liquid was still alkaline. By using large quantities of alcohol concordant results were obtained as follows:—

	Mgs. K O H per Grm.
No. 1	253.7
No. 2	272.3
No. 3	143.9
No. 4	290.0
No. 5	197.3

The iodine coefficient was also determined by the Hübl method and gave the following results:—

	Grms. Iodine per 100 Grms.
No. 1	49.6
No. 2	30.9
No. 3	76.8
No. 4	32.8
No. 5	99.5

It will thus be seen that the oils which had received the full treatment furnish abnormally high figures for soluble or volatile fatty acids and correspondingly low figures for the insoluble fatty acids. They constitute the most notable exception to ordinary fats in this respect. Of course the high per cent. of soluble acids is due to the treatment which the oils undergo in the refining process by which the glycerides of the lower fatty acids are concentrated in the oil that is finally strained off. This is conclusively shown by the foregoing figures, oils Numbers 1, 2, and 4, that received the full treatment, giving extraordinarily high results for soluble fatty acids and saponification equivalent and correspondingly lower iodine absorption coefficients, since the lower glycerides are of the acetic acid series and are indifferent to iodine.

The volatile acid present in these oils should be calculated to valeric acid. It was, however, calculated by butyric acid by the writer in order that the results should be comparable with other analyses.

It would be a matter of interest to conduct some experiments with butter fat by subjecting it to a similar process of freezing and straining and examining the resulting product, and the writer proposes to conduct such a series at his earliest opportunity. Valuable information regarding the nature of the composition of the molecular groupings in butter fat in this way may be obtained.

The oils examined as above were obtained by Dr. E. Waller from the manufacturer, and the analyses were made in his laboratory, New York City, and under his direction.—*J. Am. Chem. Soc.*

THE STANDARD OIL TRUST.

(From the Boston Herald).

IT is a curious fact that while the public sentiment in this country has been turned strongly against the formation and operation of industrial trusts, and while such organisations as the sugar trust, the American cotton-seed oil trust and others of a like class have been the objects of popular denunciation, very little has been said concerning the operations and effect of the first, the largest and the most successful undertaking of this character. The Standard Oil Trust is the association which all of these other combinations have endeavoured to copy. Its managers, or lawyers, were the first to conceive the idea of welding various corporations into an impersonal and intangible entity, and it was the enormous wealth that was accumulated by the Standard oil magnates that made the sugar refiners and the bagging manufacturers desirous of following in their footsteps.

A merit that the Standard Oil Trust possesses, which is not shared by most of those that have copied its methods, is that it is in no way dependent upon the protective tariff. If the customs tax upon sugar was entirely removed, or a uniform tax was levied both upon raw and refined sugars, the sugar trust, while it might pay to the holders of its certificates a fair return, could certainly not continue to pay 10 per cent. dividends upon a capital inflated by water three times over; for the importation of foreign refined sugars would steady the American market and keep the prices down to a reasonable level. The same remark would hold true of the bagging trust. Jute bagging would be freely imported from England if the wide margin of profit that has lately existed was not kept to the American manufacturers interested in the trust by means of the customs barriers. But the Standard Oil Trust has been free from, and independent of, foreign competition, for the reason that it had possessed, and probably for a long time to come

will continue to possess, the best field for producing, collecting, refining and shipping petroleum oil that exists on the face of the earth.

Another merit of the Standard Oil Trust is the shrewdness shown by its managers in not attempting to defiantly oppose public opinion. The Trust has had the market to itself, and yet it has not attempted to enlarge the immense profits it has secured by materially increasing the price of kerosene oil to American consumers. If it had put up the price, as it probably could have done, two or three cents a gallon, it would have made an addition to the profits of its shareholders amounting to quite a number of millions of dollars a year, but in this way public opposition would have been aroused, and legislative and congressional interference would have been invited, thus imperilling the ample profits already secured. In other words, the managers of this Trust realised from the first that they had a bountiful bonanza at their command, that might be counted upon to yield great returns year after year, so long as it was carefully nursed, while the eager desire for too large a profit might wreck the whole enterprise in a relatively short time.

What the managers of the Standard Oil Trust have done has been to use their influence to keep down the price of crude petroleum to the lowest possible point, to improve and utilise in every way methods of cheapening the cost of transporting and refining oil, and to keep the large profit resulting from these and kindred economies to themselves, while selling oil to the consuming public at no higher prices than the latter paid before the Standard Oil Trust was formed. The system pursued may be well illustrated by comparing it with another form of consolidation—that is, the trunk lines of railway to the West. If Mr. Vanderbilt, after he had succeeded in establishing a through line to Chicago, had been able to command the field, and had put into his own pocket the result of the economies brought about by consolidation and by the reduced price of steel rails and railroad equipments, the 100,000,000 dols. or more of which he died possessed would have been but a fraction of the accumulations that he might have laid up. But Commodore Vanderbilt was compelled, by the competition of other railroads, to give to the public some share in these great savings, so that freight rates over the New York Central and connecting lines are only about a quarter of what they were before his plan of consolidation went into effect.

On similar grounds it would be no more than justice for the Standard Oil Trust to grant to the American public some share in its tremendous profits, but this, considering human nature, and the human nature of those who are in the management of this association, is altogether too much to expect. They possess a great natural monopoly; they propose to work this in such a way that, without arousing public opposition, they may secure through a long series of years the largest possible amount of profit. Unless foreign competition sets in, or all trusts are effectively interdicted by natural legislation, the chances are that in a few years more the leading men in the Standard Oil Trust will be the wealthiest capitalists in the country.

THE INCREASING DEMAND FOR COPPER.

RECENTLY there have been numerous inquiries made relative to the future of the copper market, the prospective demand for that metal, and the indications as to whether that demand will increase, grow less or remain as it is now. The authorities most capable of getting at the exact situation agree in saying that in less than six months after the collapse of the French syndicate it became evident that the current production of the mines could not meet the great demand for copper in new uses, hence the only source from which the excess of consumption over production could be supplied was the surplus stock held by the syndicate. About half of this stock has already been absorbed, and it is estimated that it will entirely disappear before the close of the year. The new demand is mainly for electrical purposes, a wide field, the edges of which have just been touched. As an illustration of what the demand from this quarter is likely to be, it is estimated that 80,000 tons of copper will be consumed in lighting the City of Berlin, to say nothing of what will be taken by the other great cities of the world. In addition it is claimed that 10,000 tons will be used in sulphate of copper to destroy the vine pest phylloxera, and a possible very much greater amount in the introduction of the new smokeless powder.

A steady increase in the rise of electricity for artificial light and motive power, bids fair to make a most decided change in the value of copper. The old mines can hardly increase their product this year, and new mines cannot prepare for regular production in time to meet the increased demand. Therefore it is evident that under the conditions, which are liable to continue and become more pronounced, the future has great prosperity in store for the copper interest.—*American Manufacturer.*

THE ALKALIS AND THE TARIFF IN AMERICA.

NO class of products better illustrates the effects of tariff and the evil effects of free trade on prices than do the alkalies. The uses of soda ash, the caustic sodas, bleach and other similar chemical products that are known generally as the alkalies, are too well known to need any description. In paper making, in glass making, in the manufacture of textiles, and in many other of the important industries, these alkalies play a very important part.

Most of these alkalies have for many years been subject to duties that have been fairly protective. This duty has resulted in the establishment of the manufacture of these alkalies as important industries in this country. The last industry to become fixed with us is that of soda ash. Under the operation of these protective duties, and as a result of them, these manufactures have been established, and the price of the alkalies is gradually declining, until their prices are lower than they ever have been before.

To this statement there is but one exception, and that is with reference to bleach or chloride of lime, on which there is no duty, and which is not manufactured in this country. While the price of soda ash, of caustic soda and the other alkalies which are dutiable, has declined, the price of bleach, which is not dutiable and not manufactured in this country, has increased.

The importation of soda ash, on which there is a quarter of a cent per pound duty, and the invoice values of the same from 1886 to 1888 were as follows:—

Year.	Pounds imported.	Value per lb.
1886.....	279,931,929 ..	.012c.
1887.....	263,274,392 ..	.011c.
1888.....	267,896,710 ..	.010c.

The importation of chloride of lime or bleaching powder for the same years has been as follows:—

Year.	Pounds imported.	Value per lb.
1886.....	98,046,208 ..	.014c.
1887.....	103,097,847 ..	.015c.
1888.....	101,699,978 ..	.016c.

Now, chloride of lime, or bleach, as it is called, is a by-product of the manufacture of soda ash by the Le Blanc process. It is free of duty, and none is manufactured in this country, and it has been a notorious fact that the manufacturers of the Le Blanc soda ash have attempted to make up their loss on soda ash by increasing the price of bleach, and hence, as will be seen from the above table, while there has been a decrease of 1-10th of a cent a pound each year in the invoice value of the soda ash imported, there has been an increase of 1-10th of a cent a pound each year in the invoice value of bleach.

With a duty on bleach there is no reason why it should not be manufactured in this country.—*American Manufacturer.*

PRODUCTION AND SALE.—One of the leading iron circulars puts the cost of producing hematite iron at 25s. for the ore for one ton of pig iron, and 38s. 6d. for the coke, in West Cumberland. Something is to be added for wages, limestone, depreciation, making over £4. per ton. The hematite iron warrant price is now £3. 12s., or 8s. less than the estimated cost of production. Sale below the cost of production cannot be long maintained, and either prices must rise or production must fall soon.

BOHEMIAN GLASS.—Gablouz, on the Neisse, is the centre of the Bohemian glass industry. When the colliers of Northumberland strike, those wanting fuel can go to Wales for it; and when the mining is paralysed in Belgium, the purchasers flock to Westphalia or elsewhere. But if the glassmakers of Bohemia abandon their work *en masse*, it will be no easy matter to supply the chemists and others in all countries who depend upon their produce—upon the Bohemian glass, which, of all glass, is that which is least acted upon by chemical reagents. Bohemian glass is a silicate of potash and lime, and is very difficultly fusible.

THE TIN-PLATE TRADE.—The advisability of the adoption of some course for the restriction of make is emphasised by the very unremunerative prices (considering the still high quotations for bars) and the stoppage of several works owing to the indisposition of their owners to continue working at a loss. From a recent official report of the Swansea Metal Exchange, we extract the following:—"It was reported that six tin-plate works have already stopped, as they could not pay the present price of steel bars and manufacture plates at a cost without incurring a positive loss; therefore they consider it the wisest course to cease making and close their works. These will be followed by a great many more works, who will cease working upon the completion of the balance of any unexpected orders on hand. In the face of this disturbed state of things buyers of tin-plates are evidently keeping back orders, and are holding off, evidently with the view of ascertaining how far the price of tin-plates will be affected, and a large majority of the makers present concurred in this decision."

Correspondence.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

DETERMINATION OF MOISTURE IN WOOD PULP.

To the Editor of the Chemical Trade Journal.

SIR,—In the article "On the Determination of Moisture in Wood and Straw Pulp," by Messrs. Geo. E. Davis and Alfred R. Davis, in your last week's issue, Messrs. Davis recommend that the pulp should be dried at 212° Fahr., and, in order to convert the weight thus obtained into the weight of "air-dried" pulp, that an addition of 10 per cent. be made. But why attempt to perpetuate the practice of buying and selling pulp on so indefinite and uncertain a basis as its air-dried weight must necessarily be? Surely it would be much better to buy and sell this article on the amount of pulp it contains when dried at 212° Fahr. In this case it would only be necessary to stipulate in the contracts that the pulp should contain, say 45 per cent. of pulp dried at 212° Fahr., instead of, say 50 per cent. of "air-dried" pulp. Chemists then would be able to state without doubt exactly how much of such dried pulp is contained in a given sample. This method would be much more likely to prevent disputes than the methods suggested by Messrs. Davis, which, in my opinion, is liable to be misunderstood and misinterpreted.—I am, dear sir, yours truly,

75, Side, Newcastle-upon-Tyne.

JOHN PATTINSON.

To the Editor of the Chemical Trade Journal.

SIR,—Allow me to make a few remarks on the article "The Electric Decomposition of Chlorides in Solution," which appeared in No. 142 of the Chemical Trade Journal.

First of all, as I am a foreigner, I ask your indulgence for my bad English.

The writer of the article enters into some theoretical demonstrations which I will leave aside, because all the equations and figures show that 1.53 volt. will be sufficient for the production of chlorine by electrolysis, and that 1.54 h.p. per hour will give 1 kilo. of chlorine. The problem to be solved is the production of a substitute for hypochlorite of calcium, which is as powerful a bleaching agent, costs less, and has all the qualities, but not the drawbacks, of bleaching powder. I will not follow or criticise the article, the end of which is devoted to the demonstration of the results obtained in eight electrolyzers from a 64 h.p. engine, driving a 1,250 amperes and 40 volts. dynamo, and which he represents as being the equivalent of three tons of bleaching powder per week of 132 hours.

He is evidently a chemist, and chemists sometimes make mistakes when they argue against their new enemy, electro-chemistry, as did Dr. F. Hurter and others, or as did Messrs. Raoul Pictet, Cross and Bevan, etc., who made the *Mariée trop belle*, and not only said that electrolytic Mg. (CLO)₂ bleaches better than bleaching powder in the ratio of 5 to 3, but declared that they had obtained a yield of chlorine varying from 1.40 to 1.81 gramme, and on an average 1.47 gramme per ampere hour.

I do not find in the above-mentioned article any data respecting the density of the solution or the yield of chlorine. A concentrated solution is expensive, as bleaching liquor has to be applied to bulky materials, such as tons of paper pulp or of fibres and tissues.

The question of the yield of chlorine per ampere hour is still more important, as the cost of bleaching must be much higher if the yield of chlorine is only 0.60 grammes per ampere hour instead of .70, 0.80, 0.90, or 1 gramme. Theoretically, the yield of chlorine is 1.322 gramme per ampere hour.

This result is never practically obtained, and still less have Messrs. Raoul Pictet, Cross and Bevan, etc., obtained the 1.47 gramme per ampere hour which they claimed in their report on the Hermite process.

I will take as the basis of the following estimate the yield of one gramme of chlorine per ampere hour, to show that electrolysis compares favourably with purely chemical methods.

In twenty tanks, I will produce 20 kilos. of chlorine after the passage of 1,000 amperes through them during one hour. Within 24 hours, the production of chlorine will be 480 kilos. which will represent almost 1½ ton of chloride of lime.

To obtain 5,000 watts, assuming that the brake horse power is equal to 600 watts, it requires 8.33 h.p., the price of one kilo. of chlorine is, therefore, the cost of 8.33 h.p. per hour. In a set of 20 tanks 166.66 h.p. are necessary to generate 20 kilos. of chlorine, and for the constant generation of these 20 kilos. of chlorine per hour, during 24 hours, 3,998 h.p. hours are necessary, and will have transformed a given quantity of chloride of sodium solution into a hypochlorite of sodium solution, containing 480 kilos. of chlorine.

Assuming that the consumption of coal is 2½ lbs. per h.p. hour, it will represent in round figures six tons, to the value of which, adding that of the loss in salt and other items, the production of hypochlorite of sodium containing the same quantity of chlorine as a given quantity of bleaching powder will cost about 50 per cent. less.—Yours truly,

EMILE ANDREOLI.

London, February 24th, 1890.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED.

THE following is the report of the above company:—The accounts for the year 1889 are presented herewith to the shareholders. The net profit is £7,049. 8s. 6d., out of which a dividend of 6 per cent. per annum will be paid to the holders of the preference shares, absorbing £3,600. To the balance, viz., £3,449. 8s. 6d. must be added £8,989. 4s. brought from the last account, making £12,438. 12s. 6d., from which the sum of £5,000 is written off against expenditure on caustic soda plant, leaving a balance of £7,438. 12s. 6d. to be carried forward. It is a matter of extreme regret to the directors that the Le Blanc chemical industry does not participate in the general prosperity of the country.

The association which has existed amongst the makers for many years with the object of controlling the production of bleaching powder expired on the 31st December last, all efforts to effect a re-establishment having proved ineffectual. The value of this product has, in consequence, recently suffered a serious decline, to the extent of £2. per ton or thereabouts. Raw materials (coals especially) and labour show a sharp advance, and the cost of manufacture of the company's products will be seriously enhanced during the course of the ensuing year. On the other hand, caustic soda shows an advance of about 30s. per ton as compared with the lowest price of last year.

The plant for the recovery of sulphur, which is approaching completion, will probably be put into operation early in May next, and the sale of sulphur ought materially to influence the result of the company's operations. The cost of the erections will exceed the anticipations of the directors, and financial assistance was obtained from the late chairman upon the security of mortgage debentures. The sums so lent to the company amounted up to 31st December last to £54,000.

The directors regret to have to record the decease of Mr. Christian Allhusen, which took place on 13th ult. He had been chairman of the company since its formation, and gave its business his daily attention. By substantial pecuniary support to the company in the expenditure which it has had to make, he constantly sought to establish it in a position of permanent prosperity. It is proposed to fill up the vacancy at the Board by the election of Mr. John Edward Davidson to the position of managing director, with the same remuneration as granted to the other directors. Mr. Davidson, as one of the executors of the late Mr. Allhusen, and also as a considerable holder of shares in his own right, is largely interested in the company. He has been exclusively engaged in its business for the last 24 years, and during the last 12 years has acted as secretary and general manager of the commercial department. The directors believe him to be not only entitled to, but well qualified for, the position to which he is now recommended.

The salt works give satisfactory results. A well has recently been sunk upon another part of the royalty held by the company. A salt bed, 30 feet in thickness, was met with at a depth of 778 feet, being 312 feet nearer the surface than at the other portion of the royalty already proved by the company.

The retiring director, Mr. Alfred Allhusen, is eligible for re-election. The auditors, Messrs. Monkhouse, Goddard and Co., offer themselves for re-election.

HOW DECORTICATED COTTON CAKE IS MADE.—The cotton seed mostly grown in America, and from which the decorticated cotton cake is made is not clean and free of cotton, but is tightly bound round with lint. The main bulk of the cotton is picked off by the negroes, but the seed is afterwards sent to the ginners, who give off a deal more cotton. It is now in a fit state to be marketable, a large proportion of the seed finds its way back to the land for manure, and the smaller proportion reaches the seed crushers. These gentlemen take off as much more cotton as they can by means of linters; the seed is thence passed over to the "hullers," which sculp clean off all the black husk of the cotton seed, together with any cotton remains, and leave only the kernel. The husks now proceed to the boiler fire; the kernels are ground, rolled, heated, and then put into the hydraulic presses, where the oil is extracted, and the decorticated cotton cake results. Owing to improved machinery the oil left in the cotton cake made in the new mills shows under 8% and the cake is left perfectly hard. The idea of extracting as much oil as possible from the seed is now considered to be by no means an advantage so far as the feeding value of the cake is concerned.—*Tropical Agriculturist*.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects :—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

TECHNICAL EDUCATION IN ELEMENTARY SCHOOLS.

THE committee of the National Association for the Promotion of Technical and Secondary Education have submitted to the Education Department the following suggestions for the modification of the code as regards elementary technical education :—

DRAWING.—(1) Drawing to be introduced in infant schools, at least for boys. (2) Drawing to be made compulsory in boys' schools. (3) The minute requiring cookery to be taught in girls' schools as a condition of receiving grant for drawing to be repealed.

OBJECT LESSONS.—(4) No school to be recognised as efficient which does not provide in the three lower standards a graduated scheme of object lessons in continuation of Kindergarten instruction in the infant school.

SCIENCE.—(5) In order to encourage science as a class subject, the clause requiring English as one of the class subjects to be cancelled, and the teaching of science as a class subject to be further encouraged in the upper standards by an additional grant. (6) Scholars of any public elementary school to be allowed to attend science classes held at any place approved by the inspector, and such attendance to count as school attendance; (7) Examinations in science to be conducted orally, and not on paper, especially in the first five standards. If the inspection is satisfactory, an attendance grant of 4s. to be made for scientific specific subjects. (8) Managers to be encouraged to submit alternative courses of instruction in specific subjects under Art. 16 (Code 1888). Such subjects to receive a grant on the same principle as the subjects enumerated in Art. 15. [Art. 16. "Any other subject, other than those mentioned in Art. 15, may, if sanctioned by the Department, be taken as a specific subject provided that a graduated scheme of teaching it be submitted to and approved by the inspector." But Art. 109 (g), which lays down the condition for grants, says, "The specific subjects which may be taken are those enumerated in Art. 15."] (9) Grants to be made towards apparatus for science teaching and school museums.

MANUAL INSTRUCTION.—(10) Manual instruction to be introduced in boys' schools, corresponding to needlework for girls. (11) Instruction in the use of simple tools to be introduced in the higher standards as a specific subject, and grants to be paid thereon. (12) Provision to be made for the introduction of elementary modelling in connection with the teaching of drawing, and a grant to be made in connection

therewith. (13) Instruction in laundry work to be carried on in the schools, so far as practicable, as a part of domestic education.

EVENING SCHOOLS.—(14) The clause providing may be presented for examination in the additional subjects may be cancelled, to enable scholars to earn grants through instruction in the standard subjects. (15) The number of "subjects" which may be taken to be increased from 1

TRAINING COLLEGES.—(16) Day training colleges of training to be recognised. The universities and colleges to be utilised for the training of teacher arrangements can be made.

THE SALARIES OF SCOTTISH PROFESSORS.

A Parliamentary paper, just published, contains w a "nominal return" of the salaries, fees, and other e professors of the Scottish universities, which w account in fixing the pensions to which these gentle titled after a certain period of service. The retu chief prizes in connection with university teaching i found in the faculty of medicine at Edinburgh. T Dr. A. Crum Brown, the Professor of Chemistry £3,450.; and of Mr. William Turner, the Profess £3,000. on an average; while the following profess more than £2,000., viz., Professor Rutherford, Insti £2,521.; Professor Cossar Ewart, Natural History, Greenfield, General Pathology, £2,351.; Profess Medica, £2,235.; and Professor Balfour, Botany, Faculty of Arts the highest income is Professor St £1,233.; in the Faculty of Divinity the highest is F Biblical Criticism, £902.; and in the Faculty Rankine's, Scots Law, £1,111. In Glasgow, 1 Anatomy, heads the list with £2,233. (value of reside Professor Jack, Mathematics, formerly of Owens Co comes next with £1,758. (value of residence include the only incomes above a thousand are Professor Ni History, with £1,054., and Professor Struther's, Anat At St. Andrew's, Professor Scott Lang, Mathem Principal Donaldson, £572., and Principal Cunningl sive of residence.

Trade Notes.

THE DISPOSAL OF RECOVERED SULPHUR.—At producers of recovered sulphur under the Chance held the other day in the North-Western Hotel, it decided to form a limited company for the sale of estimated that this decision will affect 40,000 or 50, of sulphur, which is chiefly produced in Widnes and

PIG IRON PRODUCTION OF GERMANY.—According to the official returns of the German Iron and Steel Manufacturers' Association, the pig iron production of the German Empire in December amounted to 391,523 tons, made up of spiegel iron 184,379 tons, Bessemer pig 33,788 tons, and foundry pig 48,970 tons. In December 1888 the production was 354,866 tons, in November 1889, 361,000 tons, and in December 1889, 361,000 tons. The total pig iron production in 1889 was 4,387,505 tons, as against 4,387,505 tons in 1888. —*Kuhlou.*

A CARBONIC OXIDE INDICATOR.—An apparatus for the presence of carbonic oxide gas in the atmosphere was devised by M. Rasine. Its principle depends on the property of carbonic oxide to absorb carbonic oxide with evolution of sensible heat. A circuit of an electric current, two metallic plates are connected by an over each other, which is touching close the circuit. A lever is placed near these plates, in the form of a rod from one end of which the upper contact plate is suspended by an easily combustible thread. This thread is impregnated with a little cotton powder dusted over with oil. If this arrangement is exposed in an atmosphere of carbonic oxide, the spongy platinum will absorb it and set it on fire, which will in turn burn the thread, and so cause the circuit to be completed, and thereby ring a bell, or give any other desired indication of the action of the instrument. It is seen whether the spongy platinum would always react in this way, and also that the same effect would be produced by any other gas to which the apparatus would be exposed.

A) YANKEE TALL (S)TALK.—We are accustomed to look for big things to America. It is a country of big lakes, big rivers, big railways, big jokes, and big lies. To these must now be added big chimney stalks. We have it on the authority of the *Boston Globe* that the tallest chimney in the world is receiving its finishing touches at Fall River, Mass. Its height, according to our contemporary, from the top of the granite foundation to the cap is 350 feet. Would it surprise the editor of the *Boston Globe* to know that, in chimneys at least, his country does not lick creation; and that, in Glasgow, we have a stalk—that of Messrs. Charles Tennant and Co., Ltd., at St. Rollox—whose total height is 455 feet 6 inches and from surface 435 feet 6 inches. In other respects also the stalk at St. Rollox leaves its unkeek cousin behind. The outside diameter of the former being at its foundation 50 feet, and at surface 40 feet; while the latter is only 30 feet in diameter at the base. A peculiarity of the St. Rollox stalk is, that it has an inner cone inverted, whose total height is 263 feet, and from surface 243 feet, with an inside diameter at foundation of 12 feet. Reducing the usual discount from information we receive from American sources, we may calculate that the little fellow hiding up the tower leg of St. Rollox chimney is about the height of "the tallest fellow in the world" at Fall River. We have only to add that Glasgow's another larger still, should brother Jonathan's (s)talk grow taller.

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

The market for alkalis has been tolerably steady during the past week, and manufacturers find no difficulty in obtaining full market prices. Caustic soda 70 % moves off steadily at £9. per ton f.o.b., and white and cream are at corresponding values. Soda ash is very firm, and makers generally are well booked with orders for some time to come. Prices on the spot are now 1½d. per deg. for ordinary ash, 1½d. to 1¾d. for refined. Soda crystals are equally firm and in demand. Chlorate of potash steady at 4¾d. per lb. Bleaching powder is selling freely at £5. 5s. to £5 7s. 6d., free on rails makers' risks. There is but little fresh business doing in sulphur of various qualities, and prices on the spot are unchanged. The English producers are, however, well sold, and the continuance of good demand for vitriol is keeping the Chance Recovery Plant well employed. Salt is still scarce, and worth 32s. 6d. per ton in bulk. Muriatic acid is without any change. Potash caustic and carbonate are in moderate request, and prices are steady. White powdered arsenic is finding ready outlet, and prices are firmly maintained. Sulphate of copper is at £26. 10s. to £27. for prompt delivery, but buyers are generally holding off from forward purchases. There is but little movement in acetates of lime, and prices remain without change. State of soda is in a similar position, and all other acetates and stic acid are quiet. Yellow prussiate of potash can be bought at a slightly lower price—9½d. to 9¾d., according to make and quantity. Phosphocyanides scarce on the spot and prices tending upwards. Tartaric acid quiet at 2½d. to 2¾d. per lb. Carbolic acid crystals 10d. to 10½d. per lb.; liquid 1s. per gallon. Picric acid in fair demand at 3½d. to 4s. 4d. per lb.

REPORT ON MANURE MATERIAL.

Business continues on a very moderate scale both in nitrogenous and phosphatic manure material, the very low prices being realised by farmers for their crops, making manure manufacturers less sanguine for the future than they were a month or two back. Still, there is pressure of supply of phosphatic material upon the market, and prices are, consequently, fairly maintained. With nitrogenous material it is different, the excessive supply of nitrate causing a weakness all round, and a decided tendency to lower prices. Charleston River phosphate rock cannot be bought under 11d. per ton, in cargoes, cost, freight, and insurance to U.K. ports, but offers cargoes of Lank rock are invited at ½d. per unit less. Further progress of business is reported in Somme and Belgian for Continental consumption, but we do not hear of any important business done for the United Kingdom. There is considerable inquiry for Canadian k, but raisers still refusing to name reasonable prices. We have, so far, heard of any contracts for next season. There are no sales of River Plate cargoes of bones reported, though a concession would be made on prices recently asked for December shipments £5. 8s. 9d. would be accepted for a mixed December cargo, and we should say that £5. 10s. was about the value of a cargo of bones only. The market for East Indian bones and bone meal is somewhat quieter, 800 tons meal, arrived at Liverpool, having been stored with-

out being put on the market, and owners intimating their intention of storing further shipments now about due. Spot price is £5. 7s. 6d. ex quay; £5. 5s. has been accepted for a shipment near at hand, but it is doubtful whether this price would now do for earlier than February. March steamer shipment. Further sales of crushed Kurrachee bones have been made at £5. 3s. 9d. for shipment, and the purchase could be repeated, but for parcels shortly due at least £5. 5s. would have to be paid. The tendency of this market seems decidedly firmer.

Nitrate of soda continues very weak in all positions. Spot price is 8s. 3d. for fine quality, and something less than this would have to be taken for cargoes arrived or due. There seems to be no disposition whatever to speculate for an advance, notwithstanding the reports of the combination of producers to reduce the output.

Superphosphates are still quoted 50s. in bulk delivered f.o.r. at works. Further sales of fine River Plate dried blood have been made at 10s. 6d. per unit, ex quay; less being refused. For ground ammonite lowest price is 9s. 6d. per unit, net cash, delivered f.o.r. at works, and the available supply being in very small compass.

METAL MARKET REPORT.

	Last week.	This week.
Iron.....	51/10½	51/8
Tin.....	£91 0 0	£89 17 6
Copper.....	47 17 6	47 0 0
Spelter.....	21 10 0	22 10 0
Lead.....	12 12 6	13 0 0
Silver.....	44d.	43¾

COPPER MINING SHARES.

	Last week.	This week.
Rio Tinto.....	14¾ 15	15¾ 15¾
Mason & Barry....	6¾ 6½	6¾ 6½
Tharsis.....	4½ 4½	4½ 4½
Cape Copper Co. ..	3½ 3½	3½ 3½
Namaqua.....	2 2½	2 2½
Copiapo.....	2½ 2½	2½ 2½
Panulcillo.....	1 1½	1½ 1½
New Quebrada....	¾ ¾	¾ ¾
Libiola.....	3¾ 3½	3¾ 3¾
Tocopilla.....	1/6 2/-	1/6 2/-
Argentella.....	6d. 1/-	3d. 9d.

THE LIVERPOOL COLOUR MARKET.

COLOURS quiet; prices unaltered. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

Prices all round still continue to advance, and there is every prospect we shall see a further rise in figures. Manganese: Arrivals continue very limited, whilst stocks are almost nil; sales, therefore, are being made for prompt and forward delivery at advanced figures. Magnesite: Raw lump is a drug, stocks being very large; raw ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand): During the week there has been an unprecedented demand, and prices are very strong, with a certainty of further advance. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals continue steady, most of them having gone into consumption. Prices continue firm, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey,

32s. 6d. to 40s. Pumicestone steady; ground at £10., and specially selected lump, finest quality, £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 16s. to 20s. Purple ore has been sold largely for forward delivery at advanced figures. Spanish manganiferous ore commands ready sale at full prices. Emery-stone: Best brands continued to be enquired for, bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers, earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda and tungsten metal continue inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: Finest qualities in good demand, bringing full prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Lime-spar: English manufactured, old G.G.B. brand sought after, and brings full prices; 50s. for ground English. Felspar, 40s. to 25s. Fluorspar, 20s. to £6. Bog-ore in fair demand at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese strong at advanced figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Scotch makers of bichromate of potash complain of undue quietness in the order department, even after allowing that this is the off season for Continental despatches. The same applies to the market for bichromate of soda, of which the sales for the week have been very small. Prices of these bichromates are unaffected, under long-standing agreement between the makers for the maintenance of quotations above a stated level. Local makers of bleach and soda crystals, also, suffer from feebleness of demand, and prices in each case have given way. There is at the same time a slight fall in the lower strengths of caustic soda. Nitrate of soda is done at unwontedly low figures, and altogether the Scotch market stands in need of some quickening at the moment. Sulphate of copper, bichromate of soda, and saltcake being scarce, are fetching slightly higher values, and the late position in paraffins is at least maintained. In sulphate of ammonia the feeling has been weaker, with a sale or two on report down to £11. 12s. 6d., but there has been partial recovery. Yesterday in Glasgow £11. 17s. 6d. was paid, but for a specially-urgent parcel wanted at once for transatlantic shipment. Leith value at present stands no higher than £11. 15s., and, perhaps, less may be taken. Chief prices current are:—Soda crystals, 48s. 6d. net Tyne; alum in lump £4. 17s. 6d., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1½d. less 5% Tyne; caustic soda, white, 76°, £10. 15s., 70/72°, £8. 15s., 60/62° £7. 17s. 6d., and 60/62° cream, £7. 7s. 6d., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 10s., and 1 cwt. casks, £5. 17s. 6d. net Tyne; refined alkali 48/52°, 1½d., less 2½% Tyne; saltcake, 32s. to 34s. 6d.; bleaching powder, £5. 5s. to £5. 10s. less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. 3d. to 8s. 4½d.; sulphate of ammonia, spot, £11. 15s. f.o.b. Leith; salammoniack, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £27. less 5% Liverpool; paraffin scale, hard and soft, 2½d.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 9d.; paraffin oil (burning), 6½d. to 7d., at Glasgow; ditto (lubricating), 86½°, £5. 10s. to £6., 88½°, £6. 10s.; and 89/89½°, £7. 10s. to £8. Last week's imports of sugar at Greenock were 19,534 bags.

TAR AND AMMONIA PRODUCTS.

TUESDAY.

The tar products market is decidedly easier, and 3s. and 3s. 10d. may be stated as the prices of 50/90's and 90's benzol respectively. Crude carbolic acid is flat, while solvent naphtha continues in good demand and enhanced values. Anthracene still remains as already quoted, say at 1s. 2½d. per unit for B quality. Of A quality there are no parcels offering. Pitch is in a very weak condition, and foreign purchasers will not increase their stocks.

The sulphate of ammonia market is in a somewhat peculiar for while makers have been obtaining £11. 17s. 6d., £11. 18s. 9d. f.o.b. Hull, dealers and speculators are actually £11. 12s. 6d. to £11. 13s. 9d. The latter evidently being a further decline is inevitable, and they keep running down both here and abroad. Leith is now quoted at £11. 12s. 6d., but the latter price represents makes only.

Perhaps the very flat state of the nitrate market has something with speculators' movements and sulphate.

THE TYNE CHEMICAL REPORT.

TU

With the exception of bleaching powder and soda crystals, chemicals have slightly advanced during the week. Soda: good demand, and has advanced 2s. 6d. per ton. There business doing in caustic soda, but prices remain the same week. Sulphate of soda has gone up 2s. 6d. a ton. Bleach: dull at the moment and price easier. Crystals have dropped 6 To-day's prices are:—Soda crystals, 47s. 6d. per ton; caustic 77%, £10. per ton for prompt delivery; bleach powder, s casks, £5. 7s. 6d.; hardwood, casks, £5. 10s. per ton; soda: 52%, 1½d., less 5%; Sulphate, ground, in casks, 42s. 6d. sulphate, in bulk, 32s. 6d. per ton; chlorate of potash, 4½d. for prompt, 5d. per lb. forward; sulphur, £4. 5s. per ton; phite of soda, casks, £4. 5s. per ton; hyposulphite of soda kegs, £4. 15s. per ton; silicate of soda, 75° Tw., £2. 10s. 100° Tw., £3. 7s. 6d., 140° Tw., £4.; pure white sulphat mina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; ch barium, £8. per ton; nitrate of baryta, crystals, £18. 10s. ground, £19.; sulphide of barium, £5. 10s. per ton. All f.o. or f.o.r. makers' works.

At the seventh annual meeting of the Newcastle Chemical Co., Ltd., held at their offices on Thursday last, Mr. John Davidson (who for many has acted as secretary and general manager of the commercial department) was unanimously elected a director of the company. Mr. Albert Septimus Cook has pointed secretary in the room of Mr. Davidson.

The following figures are taken from the Tyne Improvement Commissioner's analysis of exports for the past year:—

	1889.	1888.
Alkali and soda ash.....	17,632 tons.	27,054
Bleach powder	26,953 „	29,712
Caustic soda	16,091 „	12,238
Bicarbonate soda	852 „	1,294
Manganate of soda	1,819 „	1,757
Alum and alum cake.....	3,017 „	3,936
Pearl Hardening	1,748 „	883
Soda crystals.....	81,891 „	100,115
Sulphate of soda	1,041 „	927

Prices of manufacturing coals are unchanged. Northumberland small is quoted 7s. 6d. to 8s. a ton, and Durham small 9s. per is generally expected that the dispute in the Durham coal to be amicably settled. The owners have made an offer of 5 advance to all classes of workmen, or they are willing to su question of an advance to arbitration.

The masters' offer has been received with satisfaction, and that a settlement can now be arrived at without loss of either side. A vote will be taken by the miners, and the res known on Saturday next.

The Sheriff Hill Colliery Company, which is to lease and mines at Sheriff Hill and Low Fell in connection with the Chemical Works, has just been registered as a limited company capital is set down at £30,000., in £10. shares. The first su are:—W. Allhusen, W. H. Allhusen, H. E. Allhusen, A. J. E. Davidson, J. J. Potts, A. S. Cook, one share each.

The Patent List.

This list is compiled from Official sources in the Manchester Laboratory, under the immediate supervision of George E. L Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Electrodes. G. A. Schoth. 2,113. February 10.
Photographic Apparatus. W. Bentley, M. H. Smith and F. Wals Feb. 10.
Controlling Delivery of Fluids. J. Pollett and J. Mangnall. 2,128
Regulating the Generation of Heat.—(Complete Specification.) 2,139. Feb. 10.
Improvements in Compressed Air Supply Pipes. J. C. Mewbi Feb. 10.

phone Switch Boards. D. Dewar. 2,153. Feb. 10.
 urretting Gas Fittings. W. Aubert, junr. 2,155. Feb. 10.
 Burners.—(Complete Specification.) F. Diemel. 2,166. Feb. 11.
 tches for Electric Circuits. H. Boardman. 2,172. Feb. 11.
 ro-Carbon Explosive Engines. H. A. Stuart and C. R. Binney. 2,181. Feb. 11.
 ting Apparatus. C. Kendall. 2,183. Feb. 11.
 ts for Lead or other Pipes. W. Hughes and E. Gippich. 2,193. Feb. 11.
 go Dyeing. J. Braithwaite. 2,195. Feb. 11.
 ssive Cement.—(Complete Specification.) W. P. Thompson. 2,197. Feb. 11.
 atures for Electro-Magnets.—(Complete Specification.) S. C. C. Currie. 2,199. Feb. 11.
 ulous Steam Generators. R. Marshall and E. Fitzgerald. 2,217. Feb. 11.
 ace Condensers. R. Marshall and E. Fitzgerald. 2,218. Feb. 11.
 al Extraction. A. Lebedeff. 2,226. Feb. 11.
 ro-Carbon Lamps. W. L. Wise. 2,227. Feb. 11.
 ro-mechanical Movements.—(Complete Specification.) S. E. Nutting. 2,234. Feb. 11.
 our Burners.—(Complete Specification.) L. S. Calder. 2,237. Feb. 11.
 Treatment of Excreta.—(Complete Specification.) C. W. Doughty. 2,238. Feb. 11.
 Manufacture of Benzol and Allied Products. F. Hlawaty. 2,242. Feb. 11.
 ization of Tin-plate Scrap. F. W. Harbord. 2,248. Feb. 12.
 phony.—(Complete Specification.) G. Macaulay-Cruikshank. 2,255. Feb. 11.
 roved Lubricant. J. Green and G. Macdonald. 2,264. Feb. 12.
 ention of Phylloxera. J. Pipe and H. D. Andross. 2,265. Feb. 12.
 aratus for Testing Electric Currents. A. C. Cockburn and F. Teague. 2,272. Feb. 12.
 ary Batteries. G. R. Postlethwaite. 2,273. Feb. 12.
 er Coil and Pipe Cleansing Boilers.—(Complete Specification.) The Western Coil and Pipe Cleansing Co. 2,278. Feb. 12.
 shing and Grinding Mills. J. C. Cole. 2,281. Feb. 12.
 Extinguishers.—(Complete Specification.) A. J. Boulton. 2,282. Feb. 12.
 ufacture of Oil Gas. W. Hughes and E. Gippich. 2,283. Feb. 12.
 trolytic Decomposition of Salts. J. C. Richardson and T. J. Holland. 2,296. Feb. 12.
 trolytic Apparatus. J. C. Richardson and T. J. Holland. 2,297. Feb. 12.
 erving Eggs. D. Brown. 2,300. Feb. 12.
 tric Batteries. H. Weymersch and R. McKenzie. 2,302. Feb. 12.
 stitutes for Lacquer Resins.—(Complete Specification.) H. Beck. 2,308. Feb. 12.
 action of Tin. J. Teague. 2,312. Feb. 12.
 sure Gauges for Compressed Gases. W. M. Jackson. 2,314. Feb. 13.
 k-making Machines. S. Denison, G. H. Denison, and W. Ward. 2,320. Feb. 13.

Brick Pressing Machines. S. Denison, G. H. Denison, and W. Ward. 2,321. Feb. 13.
 An Improved Motor for Steam, Hydraulic, or other Power. J. Robson. 2,334. Feb. 13.
 Manufacture of Lubricating Grease. H. Harford. 2,336. Feb. 13.
 Electro-magnetic Motors. G. R. Postlethwaite. 2,337. Feb. 13.
 Gas Regulators. T. Thorp and T. G. March. 2,339. Feb. 13.
 Odorizing Gases. F. Scudder and H. G. Colman. 2,341. Feb. 13.
 Mechanical Stokers. T. Wrigley. 2,343. Feb. 13.
 Glow Lamps and Portable Galvanic Batteries.—(Complete Specification.) A. L. Davis. 2,364. Feb. 13.
 Tanning. A. Leturque. 2,365. Feb. 13.
 Bricks and Fire Clay Substitutes. C. H. Edwards. 2,371. Feb. 13.
 Manufacture of Paper. H. Colley. 2,375. Feb. 13.
 The Dyeing of Skins or Fabrics. J. Koenigswerther. 2,381. Feb. 13.
 Mechanical Clinking Arrangement. B. H. Thwaite. 2,388. Feb. 14.
 Precipitation of Gold or Silver. J. Buchanan, junr. 2,390. Feb. 14.
 Stone Breakers. J. W. Lodge and B. L. Fletcher. 2,399. Feb. 14.
 Electrical Switches. F. Bathurst. 2,404. Feb. 14.
 Concentration of Solutions. A. Fryer. 2,427. Feb. 14.
 Cleansing Tin and Terne Plates from Grease. S. B. Bowen. 2,428. Feb. 14.
 Gas Pressure Regulators. H. K. Hiller. 2,429. Feb. 14.
 Manufacture of Nitrate of Ammonia. A. M. Chance and H. W. Crowther. 2,432. Feb. 14.
 Storage Batteries. F. S. Roberts. 2,439. Feb. 14.
 Manufacture of Soap. A. des Cressonnières and E. des Cressonnières. 2,446. Feb. 14.
 Steam Injectors for Steam Boilers.—(Complete Specification.) J. Desmond. 2,456. Feb. 14.
 Water Motor and Sewage Pump. J. Downton. 2,458. Feb. 14.
 Cooling Liquids. J. W. Hartley. 2,466. Feb. 14.
 The Aeration of Liquids. B. J. Sharp. 2,471. Feb. 14.
 Fusible Cut-outs for Electrical Circuits. A. H. Walton. 2,476. Feb. 14.
 Extraction of Tin. T. Teague. 2,477. Feb. 14.
 Aerated Waters. O. Avedyk and E. Halot. 2,486. Feb. 14.
 Electrical Insulators. W. Gritten and A. Parnley. 2,491. Feb. 14.
 Hydro-Carbon Lamps. J. T. Woodward, T. Woodward, and J. Thompson. 2,493. Feb. 14.
 Brick Pressing Machinery. R. H. Robinson and W. Jackson. 2,494. Feb. 14.
 Electrical Conductors. J. B. King and T. E. Bickle. 2,496. Feb. 14.
 Soluble Blue Cotton Dyestuff. H. H. Lake. 2,499. Feb. 14.
 Heating, Cooling, and Condensing Apparatus. W. R. Renshaw. 2,502. Feb. 14.
 Electric Lighting. L. Sanderson. 2,505. Feb. 14.
 Refrigerators. W. Mueller. 2,505. Feb. 14.
 Electric Batteries. E. C. F. Verschave and A. Baron. 2,506. Feb. 14.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.			
Week ending Feb. 18th.			
m—		Caustic Soda—	
olland, £25	Ohlenschlager Brs.	France, 100 c.	C. Pawson
olland, 100	Beresford & Co.	Holland, 220	Beresford & Co.
imony Salt—		Caoutchouc—	
ermany, £148	W. Balchin	B.W.I., 25 c.	L. & I. D. Jt. Co.
imony Ore—		Belgium, 157	Kebbel, Son & Co.
pan, 4 t.	H. Rogers, Sons & Co.	E. Africa, 43	Wallace Brs.
		Madagascar, 4	L. & I. D. Jt. Co.
ewcastle, 6	E. Hawkins		Kebbel, Son & Co.
ate of Lime—		Cobalt Ore—	
S., £120	W. Thatcher	New Caledonia, 153 t.	Newcomb & Son
" 150	Lister & Biggs	Chemicals (otherwise undescribed)	
enic—		Germany, 18	T. H. Lee
ermany, £150	T. H. Lee	Holland, 5	Phillips & Graves
es—		N.S. Wales, 10	Henry, Peabody & Co.
ain, 8 t. 8 c.	Goad, Rigg & Co.	Germany, 101	T. H. Lee
S., 18½	H. A. Lane & Co.	France, 920	A. & M. Zimmermann
ytes—		Caustic Potash—	
olland, 22 kgs.	J. Skitt & Co.	France, 20 pkgs.	Fuerst Brs.
elgium, 12	E. W. Carling & Co.	Dyestuffs—	
ermany, 19 cks.	Taylor, Sommer-vill & Co.	Indigo	
elgium, 20	A. Zumbeck & Co.	E. Indian, 25 cts.	L. & I. D. Jt. Co.
estone—		" 5	J. C. Shurn & Sons
rance, 3 t. 15 c.	Docks Co.	Japan, 13	W. Isted
aly, 100	Johnson & Hooper	E. Indies, 200	L. & I. D. Jt. Co.
uide of Iron—		" 24	T. H. Allen & Co.
ermany, £750	A. & M. Zimmermann	" 32	Patry & Pasteur
mine—		" 27	Arbuthnot, Latham & Co.
ermany, £300	A. & M. Zimmermann	" 22	G. Dards
am Tartar—		" 28	Lond. & Hanseatic Bank
olland, 3 pkgs.	Magee, Taylor & Co.	" 7	L. & I. D. Jt. Co.
" 23	B. & F. Wf. Co.	" 18	Oldemeyer & Hadenfeldt
aly, 8	Thames S. Tug Co.	" 15	Williams, Torrey & Co.
" 10	W. H. Mitchell	" 42	T. Ronaldson & Co.
rance, 18	E. W. Carling & Co.	" 64	P. & O. Co.
aly, 32	B. Jacob & Sons	" 28	Lond. & Hanseatic Bank
rance, 5	W. C. Bacon & Co.	U.S., 51	Walker, Munsie & Co.
aly, 148	Seager, White & Co.	E. Indies, 70	1 box. Wrightson & Son
		" 2	L. & I. D. Jt. Co.
		" 2	Langstaff & Co.

" 2	Elkan & Co.
" 7	Schenker & Co.
" 4	L. & I. D. Jt. Co.
Gambier	
E. Indies, 192 pkgs.	Elkan & Co.
" 663	E. Boustead & Co.
" 365	S. Barrow & Bro.
" 194	Elkan & Co.
" 170	P. & S. Evans & Co.
" 636	T. J. & T. Powell
China, 218	L. & I. D. Jt. Co.
Orchella	
France, 30 pkgs.	Kebbel, Son & Co.
Extracts	
U.S., 10 pkgs.	A. F. White & Co.
France, 160	Levinstein & Sons
" 50	W. France & Co.
U.S., 75	W. Burton & Sons
Denmark, 39	A. F. White & Co.
Annatto	
France, 5 pkgs.	R. J. Fullwood & Bland
Argols	
Natal, 20 pkgs.	J. R. Thomas & Co.
Tanners' Bark	
Belgium, 40 t.	T. J. Williamson & Son
" 50	Hicks, Nash & Co.
Glucose—	
U.S., 50 pkgs.	305 cwt. Barrett, Tagant & Co.
France, 1	3 J. Blank
Germany, 20	20 T. H. Lee
" 70	589 Proprs. Chamberlains Wf.
" 200	200cwt. J. F. Ohlmann
U.S., 40	210 Page, Son & East
" 50	300 Proprs. Scott's Wf.
" 1	5 Petty, Wood & Co.
" 100	100 M. D. Co.
" 120	120 J. Barber & Co.

Gutta Percha—	
E. Indies, 970 c.	H. W. Jewesbury & Co.
" 24	Katz Brs
" 530	Huttenbach & Co.
Guano—	
Holland, 17 t. 14 c.	Soundy & Son
Glycerine—	
Germany, £65	Beresford & Co.
" 50	"
Isinglass—	
St. Settlements, 5 pkgs.	L. & I. D. Jt. Co.
E. Indies, 2 pkgs.	Kurtz, Stubeck & Co.
St. Settlements, 44 pkgs.	L. & I. D. Jt. Co.
Menthol—	
Japan, £1,050	Spies, Brs. & Co.
Manure—	
Phosphate Rock	
Belgium, 200 t.	Miller & Johnson
France, 135	D. de Pass & Co.
Manure (otherwise undescribed)	
Germany, 6 t.	W. G. Blagden
U.S., 4½	C. A. H. Nichols
Manganese Ore—	
S. Australia, 377 t.	Harrold Brs.
Nitre—	
Chili, 161,606 cubic bgs.	Montgomery & Co.
Naphtha—	
Holland, 7 brls.	Domeier & Co.
Pyrites—	
Spain, 1,504 t.	Societe Commerciale
" 1,931	C. Tennant, Sons & Co.
Plumbago—	
Holland, 10 cks.	Brown & Elmslie
Ceylon, 466	Thredder, Son & Co.
" 24 cks.	Doulton & Co.
Germany, 65	Beresford & Co.
Pitch—	
France, 70 brls.	H. Hill & Son

Potassium Sulphate—
Germany, 77 pkgs. Bessler, Wachter & Co.
" 102 T. Farmer & Co.
" 73 B. & F. Wf. Co.

Potassium Carbonate—
France, 10 pkgs. J. A. Reid
" 6 W. Harloch
" 4

Stearine—
N. Z. 100 pkgs. Phoenix Whvs. Co.
France, 53 Brown & Elmslie
" 150 bgs. H. Hill & Sons

Soda—
Holland, 300 c. E. Olyett & Sons

Saltpetre—
Germany, 118 cks. P. Hecker & Co.
Belgium, 1,000 bgs. Anglo Contl. Guano Wks.
Holland, 135 cks. G. Meyer & Co.
Germany, 81 J. Hall & Son

Tartar—
Italy, 9 pkgs. Thames S. Tug Co.

Tar—
Holland, 3 brls. Burt, Boulton & Co.

Tartaric Acid—
Holland, 5 pkgs. Northcott & Son
France, 14 B. & F. Wf. Co.

Ultramarine—
Holland, 4 pkgs. J. Owen
" 4 Spies, Bro. & Co.
" 2 cks. G. Rahn & Co.
Belgium, 1 Leach & Co.

Zinc Oxide—
Holland, 105 cks. M. Ashby
" 100 Proprs. of Dowgate Dk. M. Ashby

LIVERPOOL.

Week ending Feb. 20th.

Arsenic—
Hamburg, 3 cks.

Antimony Ore—
Smyrna, 521 bgs.

Bones—
Constantinople, 451 bgs. Jivan, Tekeian, & Co.

Bone Meal—
Bombay, 8,193 bgs.

Barytes—
Antwerp, 18 brls. J. T. Fletcher & Co.
" 12 cks.

Borax—
Leghorn, 30 sks. Shropshire Union C. Co.

Borate of Lime—
Valparaiso, 720 sks.

Cream Tartar—
Genoa, 6 cks.

Caoutchouc—
Pernambuco, 9 brls. Robinson & Allen
New York, 2 cs. Fry, Miers, & Co.
Brazil, 59 brls. 5 bls. F. & A. Swanzey

Quittah—
Boston, 10 cs. T. Turner & Co.
" 3 brls. 1 pn. F. & A. Swanzey

Accra—
C. C. Castle, 11 Grimwade, Ridley, & Co.

Monrovia—
Sierra Leone, 36 Pickering & Berthoud
" 2 N. Waterhouse & Son

Cape Coast—
" 5 W. B. M'iver & Co.
" 10 2 cs. Fletcher & Co.

"—
" 2 F. & A. Swanzey
" 1 Edwards Bros.

"—
" 2 W. Duff & Co.
" 1 H. B. W. Russell

"—
" 6 A. Millerson & Co.
" 1 Havard & Co.

"—
" 1 R. H. Brotherton
" 1 L. Hart & Co.

"—
" 1 cs. Scott, Bros., & Co.

"—
" 4 Davis, Robbin, & Co.
" 3 Whimster & Co.

"—
" 1 Kronig & Seigler
" 1 E. G. Gunnell

"—
" 1 cs. A. Reis
" 2 T. Crouch

"—
" 2 Hawkes
" 2 Sommerville

Elmina, 1 ck. Tanter & Melen
" 2 1 cs. A. Reis
" 1 bg. Radcliffe & Durant

Chemicals (otherwise undescribed)
Rotterdam, 4 cks.

Dyestuffs—
Singapore, 2,101 bls.

Extract—
Bordeaux, 15 cks.
Boston, 25 brls. L. J. Levenstein & Sons

Baltimore—
60 J. C. Bloomfield & Co.

Argols—
Bordeaux, 12 cks.
Oporto, 23 German Bk., London

Cochineal—
Grand Canary, 23 bgs. Widow, Durandy, & Son

"—
" 8 K. Hindschell
" 20 Swanston & Co.

"—
" 10 H. R. Toby & Co.
" 12 K. Henderson

"—
" 12 N. P. Nathan & Son
" 15 Beriro & Co.

"—
" 13 M. L. Tuly & Co.
" 13 Kolp & Co.

Valonia—
Syra, 652 bgs. Barf & Co.
" 250
Smyrna, 842 211 1/2 t.
Patras, 200 C. P. Papayanni & Jeremies

Indigo—
Bombay, 39 cs. Forbes, Forbes, & Co.

Calcutta—
260 chta.

Dyewood—
Colon, 50 cs. E. Chesney & Co.

Divi Divi—
Curacao, 193 bgs. D. Midgley & Son

Sumac—
Palermo, 128 bgs.

Glycerine—
Rouen, 1 drim. 10 cks. R. J. Francis & Co.

"—
Rotterdam, 10 cs.
Hamburg, 5 carboys
Rotterdam, 5 cs.

Glucose—
New York, 30 brls.
Hamburg, 80 cks.

Iodine—
Valparaiso, 234 brls. Gibbs & Sons
" 11 W. & J. Lockett

Manganese Ore—
Cartagena, 2,350 t. Wigan Coal & Iron Co.

Phosphates—
Ghent, 2,040 bgs. J. T. Fletcher & Co.
Antwerp, 120 t. 100 bgs. "

Potash—
Rotterdam, 28 cks.

Pitch—
Amsterdam, 12 cks.
Rotterdam, 51

Pyrites—
Huelva, 1,848 t. Tennants & Co.
" 1,630 Matheson & Co.
" 2,046 Beauford & Co.

Saltpetre—
Calcutta, 340 bgs.
Hamburg, 16 cks.

Salts—
Hamburg, 350 t. 1,000 bgs.

Stearine—
Rotterdam, 10 cs.
Antwerp, 20 bgs.

Sugar of Lead—
Rouen, 47 cks. R. J. Francis & Co.
Rotterdam, 29 cks.

Soda—
Rotterdam, 25 brls.

Tartaric Acid—
Rotterdam, 7 cks.

Tartar—
Naples, 4 cks. R. Powles
Bordeaux, 5 1 hd.

Ultramarine—
Rotterdam, 24 cks.

Verdigris—
Bordeaux, 3 cks.

Zinc Sulphate—
Rotterdam, 7 cks.

Zinc Oxide—
Hamburg, 25 cks.
Antwerp, 130 brls.

TYNE.

Week ending Feb. 20th.

Barytes—
Rotterdam, 69 cks. Tyne S.S. Co.

GLASGOW.

Week ending Feb. 20th.

Alum—
Rotterdam, 1 ck.

Alumina Sulphate—
Rotterdam, 480 cks. H. Burrell
Rotterdam, 26 cks. J. Rankine & Son

Barytes—
Rotterdam, 92 cks.
" 69

Dyestuffs—
Alizarine
Rotterdam, 31 cks. J. Rankine & Son

Extracts—
Nantes, 691 cks.
Antwerp, 27
Rouen, 35
" 10 cs.

Glycerine—
Rotterdam, 13 cs. J. Rankine & Son
Amsterdam, 5 chys. "

Phosphate—
Antwerp, 100 t.

Pyrites—
Huelva, 1,147 t. Tharsis Co.

Stearine—
New York, 20 hnds.
Rotterdam, 36 cks. J. Rankine & Son
Antwerp, 20 cks.

Sulphur Ore—
Drontheim, 220 t.

Tartar—
Bordeaux, 3 cks.

Zinc Ashes—
Antwerp, 6 cks.

HULL.

Week ending Feb. 20th.

Ammonia—
Rotterdam, 2 cks. W. & C. L. Ringrose

Ammonium Nitrate—
Rotterdam, 28 cks. Hutchinson & Son

Albumen—
Libau, 23 pkgs. Morley, Clarke, & Co.
Savannah, 2 cs. C. M. Lofthouse & Co.

Bones—
Gothenburg, 3 brls. Wilson, Sons, & Co.

Barytes—
Bremen, 22 cks. Blundell, Spence, & Co.
" 60
Antwerp, 120 bgs. 42 brls. Bailey & Leatham

Brimstone—
Marseilles, 20 cks. Wilson, Sons, & Co.

Chemicals (otherwise undescribed)
Bremen, 3 cs. Veltmann & Co.
" 5 kgs. Storry, Smithson, & Co.

Caoutchouc—
Genoa, 18 pkgs. Wilson, Sons, & Co.
Stettin, 23 cks. W. & C. L. Ringrose
Rotterdam, 2

"—
Savannah, 1 cs. C. M. Lofthouse & Co.

Dyestuffs—
Argols
Bordeaux, 44 bgs. Rawson & Robinson

Alizarine—
Rotterdam, 31 pkgs. Hutchinson & Son

"—
" 60
" 7 cks. W. & C. L. Ringrose

Extracts
Boston, 20 cs. Wilson, Sons, & Co.
Antwerp, 15
" 69 48 cks. Rawson & Robinson

Rennet
Rotterdam, 5 cks. G. Law
Copenhagen, 2 pkgs. Wilson

Indigo
Amsterdam, 9 chta.

Glucose—
Stettin, 1,400 bgs. C. M.

Savannah—
5 cks.

Glycerine—
Hamburg, 10 cs. L.

"—
1 drum. E. &

Manure—
Ghent, 260 t. Wilson, S.
Danzig, 9 pkts.

Naphthol—
Rotterdam, 2 cks. V.

Pitch—
Danzig, 43 cks. Wilson, S.

Potash—
Rotterdam, 20 cks. Hutchin
Antwerp, 11 drums.

Salt—
Hamburg, 150 bgs. G. Law

Soda—
Rotterdam, 7 cks. G. Law

"—
4 "

Silicate—
Antwerp, 1 brl.

Stearine—
Rotterdam, 30 bgs. Wilson

Bergen—
8 brls.

Tartaric Acid—
Rotterdam, 4 cks.

Turpentine—
Savannah, 1,000 brls.

Tartar—
Bordeaux, 3 cks. Rawson &

Tar—
Marseilles, 50 cks. Wilson

GRIMSBY

Week ending Feb. 15th.

Albumen—
Hamburg, 3 cks.

Chemicals (otherwise unde
Hamburg, 13 pkgs.

Dyestuffs—
Extracts
Dieppe, 39 cks.

Glucose—
Hamburg, 200 bgs. 12 cks.

Zinc Ashes—
Antwerp, 19 cks.

GOOLE.

Week ending Feb. 12th.

Acetic Acid—
Rotterdam, 1 ck.

Chromium Acetate—
Rotterdam, 10 cks.

Caoutchouc—
Boulogne, 4 cks.

Dyestuffs—
Alizarine
Rotterdam, 78 cks.

Dyestuffs (otherwise unde
Boulogne, 73 cks. 4 cs.

Glucose—
Hamburg, 10 cks.

Logwood Extract—
Rotterdam, 2 cks.

Naphthylamine—
Rotterdam, 2 brls.

Phosphate—
Ghent, 1,500 bgs.

Phthalic Acid—
Rotterdam, 2 brls.

Potash—
Calais, 51 cks. 69 drums.

Saltpetre—
Rotterdam, 70 bgs.
" 170
Hamburg, 85 4 cks.

Ultramarine—
Rotterdam, 1 ck.

Waste Salt—
Hamburg, 194 cks. 102 bgs.

EXPORTS OF CHEMICAL PRODUCTS

FROM

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.			LIVERPOOL		
Week ending February 15th.			Week ending Feb. 18th.		
Ammonium Carbonate—			Alum—		
Paris, 3 t. 14 c.	£112		Galatz, 39 t. 9 c.	£186	
Dunkirk, 1	33		Baltimore, 12 6	60	
Cadiz, 1 brl.	4		B. Ayres, 1	6	
Bordeaux, 2 t.	60		Melbourne, 1	6	
Stettin, 15 cks.	89		Patras, 4 9	93	
Ammonium Sulphate—			Catania, 18 3 q.	5	
Ghent, 101 t. 6 c.	£1,250		Rosario, 4 3	20	
Jersey, 24	320		Genoa, 2 11 1	12	
Martinique, 200 1 c.	2,480		Smyrna, 1 8	17	
Ghent, 49	585		Sydney, 1	5	
Berlice, 15 10	196		Ammonium Muriate—		
Trinidad, 23	220		Philadelphi, 21 t. 5 c. 3 q.	£301	
Barbadoes, 55	660		New York, 6	123	
Hamburg, 2,404	1,455		Rosario, 10 19	270	
Acetic Acid—			Rosario, 15	14	
Melbourne, 5 cks.	£4		Antimony Regulus—		
Arsenic—			Portland, 14 c. 2 q.	£17	
Boston, 25 t. 10 c.	£300		Ammonium Carbonate—		
Acids (otherwise undescribed)			Rosario, 1 t. 5 c.	£5	
New York, 30 cks.	£85		Venice, 1 t.	32	
Bisulphide of Carbon—			New York, 13 1 q.	420	
Philadelphia, 4 t. 6 c.	£55		Alum Cake—		
Borax—			Smyrna, 5 t. 3 c.	£25	
Wellington, 5 kgs.	£8		Ammonium Sulphate—		
Boracic Acid—			Genoa, 61 t. 3 c. 1 q.	£721	
Wellington, 5 c.	£11		Ghent, 50 10 2	609	
Chemicals (otherwise undescribed)			Gr. Canary, 27 8 1	219	
Adelaide, 20 pks.	£91		Valencia, 100	1,250	
Calcutta, 15 cks.	144		Leghorn, 10 9 2	135	
Bombay, 28	121		Hamburg, 25 3	303	
Melbourne, 19	13		Bordeaux, 27	312	
Philadelphia, 5 kgs.	18		" 4 3	98	
Cape Town, 43 cks.	55		Rosario, 110 5	1,300	
Yokohama, 200 kgs.	383		Las Palmas, 20 7 2	241	
Citric Acid—			Ghent, 29 14	335	
Calcutta, 1 cks.	£2		Barytes Nitrate—		
Cadiz, 5 c.	35		Vigo, 5 c.	£5	
Constantinople, 2 cks.	£15		Bari, 19	27	
Liban, 10 cks.	350		Borax—		
Drontheim, 2 c.	6		St. John's, N. B., 9 c. 3 q.	£14	
Adelaide, 10	68		Portland, 1 t. 13	50	
Sydney, 3	19		Rouen, 32 11 c.	1,200	
Lisbon, 14	91		London (Ont.) 9	13	
B. Ayres, 6 kgs.	45		Bleaching Powder—		
Reval, 6 c.	45		Ancona, 4 cks		
New York, 1 t.	135		Bombay, 141		
Cream of Tartar—			Calcutta, 73		
Otago, 1 cks.	£6		Carthagen, 15 brls.		
Cape Town, 1 kg.	3		Ghent, 54		
Canterbury, 10	53		Malaga, 30		
Adelaide, 15 c.	85		Philadelphi, 50 tcs.		
Carbolic Solid—			Rosario, 6 cks.		
Hio, 4,000 lbs.	£264		Rouen, 30		
Otago, 1 c.	4		Terneuzen, 29		
Carbolic Acid—			Alicante, 30		
Melbourne, 1 cks.	£8		Antwerp, 56		
" 20 drums.	15		Genoa, 265		
Yokohama, 6,000 lbs.	360		Ghent, 212		
Clarifiants—			New York, 379		
Palermo, 1 ck.	£5		Odessa, 15		
Copper Sulphate—			Philadelphi, 44		
Lisbon, 5 t. 5 c.	119		Caustic Soda—		
Liban, 9 cks.	60		Maranham, 25 brls. 10 dms.		
Adelaide, 5 t.	£120		Mexico City, 300		
Treport, 36 cks.	200		Marseilles, 65		
Caustic Soda—			New York, 1,619		
New Orleans, 15 t.	£100		Odessa, 260		
Disinfectants—			Oporto, 44		
Melbourne, 72 pks.	£88		Punta Arenas, 12		
Hamburg, 10 cks.	50		Rio Grande do Sul, 18		
Fluoric Acid—			Rosario, 106		
Sydney, 1 cks.	£3		Philadelphi, 100 135 brls.		
Glycerine—			Portland, 490		
Otago, 2 drums.	£4		Porto Alegre, 20		
Boston, 3 cks.	11		Alicante, 10 cks.		
Cologne, 196 c.	£240		Antwerp, 25		
Guano—			Barcelona, 257 24		
Berlice, 30 t. 2 c.	£316		Bari, 150		
Trinidad, 52	498		Boston, 150		
Barbadoes, 126 t.	1,260		Cadiz, 10 brls.		
Hamburg, 10 7	70		Calcutta, 160		
			Carthagen, 15		
			Ceara, 20		

Disinfectants—	
Bombay, 3 cs.	£8
Epson Salts—	
Rio Janeiro, 50 kegs.	
Juano—	
Carthagena, 51.	£50
Chilera, 249 14 c.	2,500
Malaga, 50	298
Valencia, 250	2,200
Glycerine—	
Hamburg, 6 t. 17 c.	£168
Monte Video, 2	7
Iron Oxide—	
Campana, 1 t.	£10
Magnesia—	
Genoa, 10 cs.	
Rio Janeiro, 30	
Vulparaiso, 12 cks. 10 cs.	
Constantinople, 12	
Havana, 12	
Magnesium Calcide—	
Havana, 1 c. 1 q.	£161
Manure (otherwise undescribed)	
Havre, 157 t. 12 c.	£544
Marseilles, 110 8	478
G. Canary, 12	91
Oxalic Acid—	
Barcelona, 14 c. 3 q.	£31
Potassium Bichromate—	
Antwerp, 5 t. 10 c.	£181
Havre, 3 1	144
Smyrna, 9 3 q.	18
Philadelphia, 14	18
Pieric Acid—	
New York, 1 t.	£140
Pitch—	
Bathurst, 5 brls.	
Genoa, 1,386 t.	
Marseilles, 448	
Potash Crystals—	
Barcelona, 15 t. 14 c.	£438
Potassium Chlorate—	
Rotterdam, 17 t.	£747
Santo, 10 c.	21
New York, 10 14	493
Shanghai, 2 10	117
Montreal, 1	44
Portland, 15	30
New York, 12 10	864
Yokohama, 12 10	685
Copenhagen, 1	46
Hamburg, 19	40
Shanghai, 1 8	71
Alexandria, 1	42
Molendo, 7	22
New York, 10	397
Potashes—	
Catania, 2 t. 10 c. 2 q.	£57
Phosphorus—	
Bueno Ayres, 1 t. 16 c.	£200
Salt—	
Antwerp, 210 t.	
Bahia, 11 c.	
Bombay, 100	
Brass, 150	
Calcutta, 551	
Cape Coast, 7 1/2	
Chicago, 130	
Copenhagen, 832	
Durban, 6 cs.	
Ghent, 156	
Loango, 15	
Hamburg, 289 1/4	
Melbourne, 100	
New York, 65	
Para, 39 1/4	
Boston, 320	
Iles de Los, 50	
Lagos, 200	
Landana, 5 16 c.	
Monte Video, 5 1/2	
New Orleans, 735	
Rio Janeiro, 3 4	
Rangoon, 9,000 t.	
Yokohama, 2 1/2	
Soda Ash—	
Barcelona, 18 cks.	
Bombay, 13 brls.	
Bombay, 28 tcs. 92 cks. 204 brls.	
Galatz, 42 brls.	
Ibriro, 35	
Leghorn, 2 cks.	
New Orleans, 242 tcs.	
Philadelphia, 33 brls.	538 tcs.
Portland, 237	
Rio Janeiro, 100 brls.	20
Serville, 50	
Smyrna, 40	
Baltimore, 552 tcs.	
Barcelona, 15 cks.	
Beyrout, 100 brls.	
Bombay, 40 kgs.	

Boston, 170 cks. 720 bgs. 130 tcs.	
Calcutta, 49 brls.	
Genoa, 33 cks.	
Ghent, 44	
Maranham, 10	
Mitylene, 200 brls.	
Monte Video, 10	
New York, 53 cks.	
Patras, 30	
Philadelphia, 193 tcs. 339 cks.	
Porto Alegre, 37 brls.	
Rio Grande do Sul, 45 cks.	
Rio Janeiro, 130 brls.	
Santander, 6	
Santos, 10	
Smyrna, 400	
Sydney, 65 cks.	
Soda Crystals—	
Havana, 6 brls.	
Malta, 50	
Pernambuco, 200	
Philadelphia, 50 cks.	
Santander, 65	
Singapore, 5	
Bombay, 520	
Calcutta, 34	
Halifax, 50	
New York, 28	
Philadelphia, 60	
Sodium Bicarbonate—	
Amsterdam, 20 kgs.	
Barcelona, 150	
Buenos Ayres, 25 cks. 20 kgs.	
Calcutta, 298 brls.	
Ghent, 15 kgs.	
Hamburg, 22 54 pkts.	
Kurrachee, 350	
Monte Video, 90	
Sydney, 200	
Toronto, 20 cks.	
Yokohama, 1,000	
Antwerp, 16	
Genoa, 80 62 bxs.	
Havre, 225 2 cks.	
Marseilles, 30	
Rouen, 50 brls.	
Trieste, 183	
Sodium Silicate—	
Maranham, 10 brls.	
Sodium Nitrate—	
Carthagena, 2 t. 10 c. 3 q.	£22
Montreal, 1 4 2	11
New York, 8	11
Alicante, 1 19 3	16
Venice, 3 18 2	33
Boston, 5 1	15
Malaga, 3 5 3	27
Saltpetre—	
Las Palmas, 3 t. 19 c. 2 q.	£82
Madeira, 16	22
Pernambuco, 2 17	64
Carril, 1 1 2	25
Carthagena, 5 1	96
Ceara, 12 2	13
Sulphuric Acid—	
Bombay, 7 c. 3 q.	£5
Ceara, 53 gals.	16
Sodium Bichromate—	
Antwerp, 8 t. 12 c. 3 q.	£260
Rotterdam, 18	27
Sodium Bichromate—	
Havre, 12 c. 2 q.	£20
Sheep Dip—	
E. London, 5 t.	£250
Buenos Ayres, 3 c. 1 q.	7
Cape Town, 20 cs.	40
Salammoniac—	
Philadelphia, 4 t. 2 c.	£141
Shanghai, 10 1 q.	19
Alexandria, 2 4	78
Catania, 10 2	20
Lagos, 4	9
Rotterdam, 17 1	30
Constantinople, 2 4	68
Montreal, 4	8
New York, 4 16	165
Patras, 8	14
Galatz, 10	17
New York, 4 16	166
Sulphur—	
Porto Alegre, 2 t. 9 c.	£16
Madras, 5 5	29
Iquique, 15 1 3 q.	121
Calcutta, 3 0	26
Boston, 100 7	426
Saltcake—	
Philadelphia, 36 t. 17 c.	£78
Baltimore, 185 10	324
New York, 100 3	246
Soda Salts—	
Portland, M., 1 t. 6 c. 2 q.	£38
Tar—	
Bahia, 40 brls.	

HULL.

Week ending Feb. 18th.

Acids (otherwise undescribed)—

Hangesind, 2 cks.

Bone Size—

Harlingen, 11 cks.

Hamburg, 5

Bleaching Powder—

Danzig, 232 cks.

Venice, 30

Chemicals (otherwise undescribed)

Antwerp, 8 cs. 5 cks.

Bremen, 2 30

Bombay, 2,172 135 pks.

Christiania, 5 pkgs.

Copenhagen, 108

Danzig, 2 60 pks.

Dunkirk, 16

Gothenburg, 15 45 100 322 silbs.

Ghent, 8 pkgs.

Hamburg, 10

New York, 100

Reval, 10 80

Rouen, 30

Rotterdam, 41 5 70

Stettin, 1 1 1

Trieste, 10

Venice, 103

Caustic Soda—

Antwerp, 34 drms. 1 ck.

Danzig, 10

Gothenburg, 36

Venice, 60

Libau, 141

Reval, 500

Dyesuffs (otherwise undescribed)

Bombay, 53 cks.

Hamburg, 1 cs.

Reval, 4 84

Rotterdam, 3 1 keg.

Manure—

Dunkirk, 882 bgs.

Ghent, 280

Venice, 6 t.

Hamburg, 278

Pitch—

Antwerp, 194 t.

Tar—

Copenhagen, 20 cks.

Danzig, 6

GLASGOW.

Week ending Feb. 20th.

Ammonia—Buenos Ayres, 3 t. 1 c.
Ammonium Sulphate—	
Nantes, 60 t. 17 1/4 c.	£727
Benzol—	
Rotterdam, 78 drums	£970
Bleaching Powder—	
Bombay, 2 t. 18 c.	£26
Boracic Acid—	
Circassia, 32 c.	£57
Chemicals (otherwise undescribed)	
Rangoon, 5 t. 2 1/4 c.	£28
Copper Sulphate—	
Nantes, 15 t. 12 c.	£286
Gutta Percha—	
Amsterdam, 194 lbs.	£8
Iodine—	
Halifax, 29 1/2 c.	
Naphtha—	
Rouen, 1	£798
Potassium Bichromate—	
Japan, 6 t. 10 1/4 c.	£253
Barcelona, 109 1/4	200
Rouen, 58 14	1,856
Barcelona, 330	68
Bergen, 3	40
Rotterdam, 3	25
Amsterdam, 24	352
Christiania, 1 ck.	15
Halifax, 4 1/2 t.	142
Potassium Prussiate—	
Rouen, 5 t. 6 1/2 c.	£275
Pitch—	
Nantes, 442 t.	£442
Barcelona, 250	375
Sodium Bichromate—	
Rouen, 29 t. 1 c.	£780
Barcelona, 68 1/4	100
Rotterdam, 1 ck.	12
Soda Ash—	
Halifax, 1,228 1/2 c.	
Sulphuric Acid—	
Bombay, 10 c.	£37
Rangoon, 12 t 19 1/2	135
Tar—	
Colombo, 8 t.	
Penang, 4 1/2 c.	108

TYNE.

Week ending Feb. 20th.

Alkali—

Amsterdam, 105 t.

Rotterdam, 3 t. 19 c.

Antwerp, 10 6

Alum Cake—

Nyborg, 27 t. 17 c.

Bleaching Powder—

Antwerp, 17 t. 6 c.

Hamburg, 33 9

Lisbon, 6 4

Baltimore, 50 7

Christiania, 4 14

Amsterdam, 31 16

Copenhagen, 116 14

Rotterdam, 15 2

Gothenburg, 1 8

Malmo, 1 10

Aarhus, 6

Barytes Carbonate—

Copenhagen, 1

Caustic Soda—

Antwerp, 5 2

Hamburg, 2 15

Carthagena, 1 3

Baltimore, 155 1

Gothenburg, 61 17

Copenhagen, 29

Magnesia—

Antwerp, 3 c.

Hamburg, 7

Manure—

Hamburg, 40 t.

Pitch—

Antwerp, 15 c.

Potassium Bichromate—

Nyberg, 1 t

Potassium Chlorate—

Rotterdam, 1 t. 10 c.

Soda—

Nyborg, 23 t. 14 c.

Esbjerg, 11 15

Frederikshavn, 7 t. 9 c.

Sodium Sulphate—

Copenhagen, 1 t. 17 c.

Baltimore, 201

Aarhus, 10 9

Soda Ash—

Christiania, 10 1

Lisbon, 16 9

Baltimore, 29 19

Bergen, 3 10

Copenhagen, 9 19

Gothenburg, 46 4

Sodium Bicarbonate—

Amsterdam, 3 t. 10 c.

Sodium Chlorate—

Hamburg, 1 t.

GRIMSBY.

Week ending February 15th.

Chemicals (otherwise undescribed)

Antwerp, 2 cs. 18 pkgs.

Dieppe, 40 cks.

Hamburg, 10

Rotterdam, 4 cs. 18

Coal Products—

Antwerp, 10 cks.

Dieppe, 24 cs.

GOOLE.

Week ending Feb. 12th.

Bleaching Powder—

Ghent, 28 cks.

Bleaching Preparations—

Rotterdam, 28 cks.

Benzole—

Rotterdam, 75 cks.

Chemicals (otherwise undescribed)

Antwerp, 2 pkgs.

Ghent, 1 cks.

Hamburg, 5

Coal Products—

Rotterdam, 161 cks.

Dyestuffs—

Ghent, 2 cks.

Manure—

Dunkirk, 494 bgs.

Ghent, 334

Rouen, 95

Pitch—

Antwerp, 160 t.

Dunkirk, 192

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

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RAILWAY RATES

WE hope the traders are so far satisfied with the crusade against the rates and charges of the Companies. From the outset we foresaw that the subject would be a very unequal one, and we endeavoured to bring it before the public in narrow walls, that the evidence, even of such a kind as was within the reach of the traders, would have made their arguments irresistible. The course was not followed, and the Traders' Association had the chagrin of seeing their champions, one by one, demolished, without having made one point of vantage.

Time has only served to strengthen the opinions we more than once expressed in these columns, that it would have been better to have adopted the various classifications proposed by the companies, and even the terminals in the bargain, rectifying any incongruity by the introduction of a good system of classification. We do not see why this should not be done for every particular branch of industry, as far as the chemical and allied industries were concerned. We attempted to show, and we think with a fair measure of success, how such a classification could be established on a rational basis.

It will be clear to those who have followed the proceedings of the Board of Trade Commission, that the Commission do not intend to allow of the introduction of any arbitrary schemes, the practical effects of which are preposterous; and it must not be forgotten that at any time a very difficult task to blend such a variety of interests are represented before the court of enquiry.

It is not too late yet for the traders to take in hand the question of a systematic classification; there has been time, but the opportunity has so far been missed. We rely on good authority that the companies are willing to be more, anxious to arrive at a satisfactory and lasting classification, if the traders would only approach them with reason.

Nothing but a satisfactory classification will stop the fraudulent description of goods, brought out so well the other day by Mr. David Howard in his evidence at the enquiry, and this is the *bête noire* of all honest traders. We fear agitation has for the most part been fomented and encouraged by those who have been labouring under private advantages, often of their own choosing in the way of rates, and they have not recognised the fact that they are not in the great majority of cases charged for carriage, except in the full extent that the companies are legally entitled to charge. We are fully aware, however, that there are grievances requiring a remedy, but we have all along felt that the traders have not gone the right way to work to get them redressed. The Lancashire and Cheshire Conference carried on its meetings with a great flourish of trumpets before the battle began; where is it now?

“False Sextus to the mountains
Turned first his horse's head,
And fast fled Ferentinum,
And fast Lanuvium fled;
The horsemen of Nomentum
Spurred hard out of the fray,
The footmen of Velitrae
Threw shield and spear away.”

CHEMICAL ENGINEERING.*

XXI.

MOVING LIQUIDS.

AVING now dealt with the conveyance of solid substances from place to place, it becomes necessary to treat of the movement of liquids. It may at first be thought that with liquids, the only problem is that of raising them, as unlike solid bodies, they require no exertion to move them from a higher to a lower level, or from place to place on the same level. To a certain extent only is this true; there is more needed, perhaps, in designing machinery for elevating a liquid, than for allowing of its descent, but there are many points to be considered even in this latter case, such as the size of the pipes required for a certain flow in a given time, for an intermittent or a continuous supply. These subjects can, however, be treated as applying also to the problem of raising fluids, when the principles underlying them have been explained.

The velocity, and necessarily the quantity, of any fluid flowing its way through an orifice depends in a great measure on the force employed to send it through. The shape of the aperture is likewise a point necessary to be taken into consideration, but the force is the main factor; it is a well-certain quantity and is universally described as "head." H = the height of the water above the centre of an orifice, in feet, and d = the diameter of the orifice in inches, the theoretical discharge in gallons per minute may be obtained from the following formula:—

$$\sqrt{H} \times d^2 \times 16.3$$

In practical application of this formula will be given in the next chapter, but as mentioned, the result is only an approximation: it is the *theoretical* discharge. The nature and form of the orifice determines to a very large extent the actual discharge, a hole in a thin plate, a short tube or a long tube, each giving different quantities.

What I wish to establish in your minds in the first place, is the exact quantity represented by the varying pressure, or force, or head, which determines the velocity—*ceteris paribus*—at which a fluid will issue from a given orifice. H is the height of the fluid above the centre of the orifice, and a mobile fluid under the pressure of a "head" H will issue from that orifice at the same velocity, as that of a body falling freely from the height H . If V be the velocity in feet per second, the theoretical velocity is represented by:—

$$V = \sqrt{H} \times 8.025$$

It will thus be seen that the "head" in feet can easily be converted into lbs. per sq. inch. It is usual in practice to assume that a head of water in feet is double the number of lbs. per square inch, this is often sufficiently near, but the true figures are 0.4327 lbs. per square inch, to each foot head of water, the head in any other fluid may easily be obtained when the specific gravity is known.

The following tables have been calculated for rapid comparison of these numbers:—

Lbs. per sq. inch.	Head of water in feet.	Head in inches of mercury.
1	2.311	2.046
2	4.622	4.092
3	6.933	6.138
4	9.244	8.184
5	11.555	10.230
6	13.866	12.276
7	16.177	14.322
8	18.488	16.368
9	20.800	18.414
10	23.110	20.460
Head of water in feet.	Lbs. per sq. inch.	Head in inches of mercury.
1	.4327	.8853
2	.8654	1.7706
3	1.2981	2.6560
4	1.7308	3.5413
5	2.1635	4.4266
6	2.5962	5.3120
7	3.0289	6.1973
8	3.4616	7.0826
9	3.8942	7.9679
10	4.3270	8.8533

Head in inches of mercury	Head of water in feet	Lbs. per sq. inch.
1	1.1295	.4887
2	2.2590	.9775
3	3.3885	1.4662
4	4.5181	1.9550
5	5.6476	2.4437
6	6.7771	2.9325
7	7.9066	3.4212
8	9.0361	3.9100
9	10.1656	4.3987
10	11.2952	4.8875

The discharge of water from orifices, and its flow in open shutters or channels, will be explained in the next lecture, though to some extent perhaps it should be mentioned now; but we shall have enough before us to consider the flow in pipes, however that flow is produced. It is well known, even in the simple operation of decanting through a funnel or "tundish" some attention must be paid to the duct by which the fluid escapes, and experiments may easily be made in the laboratory to show the practical effect of lengthening the fall-tube of the funnel, or of increasing the horizontal outflow pipe from a tank of liquid. In short, the longer the pipe the less liquid will flow through it in a given time under the same pressure or head, or, to maintain the same flow through a long pipe as through a short one, the pressure or head must be increased. We have no such practical illustrations of the truth of this argument in this country as they have in America. In the States a 4 in. oil main of 60 or 70 miles long is no uncommon experience, and the friction of the main itself often amounts in such distances to nearly half a ton per square inch.

Hawksley's formula for the flow of water through pipes is:—

$$G = \sqrt{\frac{(15 D)^5 H}{L}} \text{ and}$$

$$D = \sqrt[5]{\frac{G^2 L}{15 H}}$$

where G = the gallons per hour,
 L = length of pipe in yards,
 H = head of water in feet,
 D = diameter of pipe in inches.

The foregoing formula pre-supposes the pipe to be a straight one. Eytelwein gives another formula for straight pipes as:—

$$W = 4.72 \sqrt{\frac{D^5 H}{L}} \text{ and}$$

$$D = 538 \sqrt[5]{\frac{L W^2}{H}}$$

where D = diameter of pipe in inches,
 H = head of water in feet,
 L = length of pipe in feet,
 W = discharge per minute, in cubic feet.

Taking water or an equally mobile fluid, the head necessary to overcome friction may be obtained approximately from the following formula:—

$$H = \frac{G^2 L}{(3d)^5}$$

where H = the head in feet,
 L = length in yards,
 d = diameter of pipe in inches,
 G = gallons of discharge per minute.

When bends occur in the discharge pipe the case is often a complicated one, but thanks to the labours of a few experimentalists, we have data for the calculation of "head" necessary to overcome the friction which they cause.

If A = the angle of bend with the forward line,
 V = the velocity of flow in feet per second,
 K = a co-efficient for angle, as under,
 H = head necessary to overcome friction.

$$\text{then } H = 0.0155 V^3 K.$$

*A course of lectures delivered by Mr. George E. Davis, at the Manchester Technical School. All rights reserved.

A	K	A	K	A	K
20°	.046	60°	.364	90°	.982
40°	.139	80°	.741	100°	1.264

All the foregoing formulæ have a very important bearing upon the problem of designing plant, but it must not by any means be thought that the subject is exhausted. The matter is often a very difficult one, but the theoretical aspects of the case are more often than not subverted in practice by making the conduit large enough. If a certain pipe is not found of sufficient size to convey a certain quantity of liquid in a given time, the rule of thumb method is to pull it down and replace it by another, the diameter of which has been selected haphazard. Another feature that must not be neglected is the nature of the liquid under consideration, which is often a very important factor. For instance, in calculating pipes for the flow of glycerine the foregoing water formulæ could not be employed, and with a substance like gas-tar, so much depends upon its viscosity that when the suction and delivery pipes are subjected to atmospheric influences there is a marked difference in the rate of delivery in summer and winter.

The viscosity may often be reduced by warming the pipes through which the liquid is made to flow, and a special instance is still in my memory. The pressure on a tar main was 210 lbs. per square inch when the pump was running, and consequently difficulty was found in keeping the joints tight; the tar was very viscous, but by threading a half-inch steam pipe through the delivery pipe of the system a full flow was readily maintained with a pressure of only 60 lbs. per square inch.

It must not be forgotten, moreover, that theoretical calculations refer only to new pipes or to those of smooth bore, the effects of corrosion, or deposits, upon the interior surface of pipes is sufficiently serious to demand special attention. Incrustations upon the interior of pipes, not only decrease the delivery capacity by constricting the area, but increase the friction to an alarming extent.

There are many interesting problems that can be solved by the application of the foregoing formulæ, and more will be said upon the subject in the lecture on weighing and measuring, but in the meantime enough has been put forward to show you that there need be no "rule of thumb" work in matters relating to the moving of liquids from one place to another.

Having our mains laid, it now remains to apply the head, or pressure, necessary to force the liquid through them. This may either be done with a natural head, or a pressure supplied by artificial means. In either case there is no difficulty in measuring it; the actual measurement above the orifice of outflow will give us the quantity we seek in the first instance, while actual measurement with a pressure gauge will determine the head in the second. The power required is also well known and calculated when we remember that 33,000 foot pounds per minute means one horsepower. In actual practice, double the theoretical power is generally required to drive pumps of ordinary construction, if indeed a much larger proportion is not found necessary, as without a pump is large enough to be called a "pumping engine," it is usually a much abused and neglected instrument. It is not my intention to give you a dissertation on pump construction, as that belongs entirely to the mechanical engineer, though it may be as well to call attention to several points that must be studied by the chemical engineer. First, there is the material of which the pump is constructed, and this is no unimportant point in connection with its use in the chemical and allied industries. Secondly, the type of pump best suited to the work in hand, and thirdly, the form and nature of the valves employed in construction. The material used for the construction of the pump must, of course, be selected on account of its chemical and physical properties, an iron pump would be of little use in dealing with aqueous hydrochloric acid, and similarly experience shows us that a brass pump is rapidly corroded by alkaline solutions. A general chemical knowledge will, in

most cases, enable the proper selection of material, effect, even of slight chemical action, must never be looked. And again, even when it is known that the side is perfect, the physical character of the material unsuitable, and here there is often room for a considerable amount of inventive genius. As an instance, the material will resist, fairly well, even strong hydrochloric acid, but this material is a very brittle and crystallisable and requires special treatment in order to adapt it to use with corrosive liquids. Other materials, such as earthenware, stoneware, ebonite, etc., have been used with more or less success in pump construction, but as a general rule they have not found much favour, chiefly, I believe, from design, whereby fractures too often occurred.

The second feature—the type of pump—which should be selected for varying classes of work, is often hazarded out "rhyme or reason." The types of pumps in the market is legion, and it is very seldom that a pump user is able to give a satisfactory account of his reasons for selecting one. In an average chemical works in England, the pump is not fully treated and sorely neglected, and usually a pump is chosen irrespective of any intrinsic merits, but mainly because it will stand a considerable amount of battering about the works off and patching at the hands of the works fitter, and with badly packed glands and worn out valves, and is absolutely breaking down. This is not what it should be, but I am afraid it will be so until foremen in charge of things are in possession of more technical information than they possess at present. When a pump absolutely ceases to deliver (and not till then) it is usually overhauled by a mechanic, and as a result it is more often than not left in a worse state than before. If those in charge of pumps only appreciate that 95 per cent. of pump trouble arises between the end of the suction pipe and the plunger of the pump, they will have learned their first lesson in pump selection. Wherever it is possible, the suction pipe should be provided with an efficient foot-valve, and both suction and delivery pipes be large enough to reduce the friction to a minimum. Friction in the suction pipes causes a loss of power, and increases the tendency to entrance of air by the joints in the glands—friction in the delivery pipes is also a waste of power and a cause of leaky joints.

Amongst the types of pumps there are many to choose from, the single acting lift pump, and the old fashioned and force pattern are forms the beginner may study with advantage, as all the forms of ram and piston pumps depend for their action upon modifications of the principles that are to be found utilised therein. Steam pumps are single acting and double acting, some with fly-wheels, and some without, and the greatest diversity of opinion prevails as to the suitability of this or that pattern for special work. It is my intention to put myself in conflict with the market by any particular form of pump, by describing the pattern known by Mr. A or Mr. X as the best, but I would enjoin every one to look well to three points before purchase: first, that all the parts are so arranged as to be readily accessible for lubrication and cleaning; second, that there is plenty of room for packing glands, turning nuts, pet cocks, &c., without being cramped in any way; and third, that the chambers are readily accessible without undue labour the shifting of heavy parts.

There then remains the question of the suitability of valves to the fluid to be pumped, and I am afraid that thing but actual experience will be of much service in this direction, except that the pump is often blamed for the comings of those who work it. A pump that will pump sand, stones, barrel-shives, or liquids equally well, is desideratum in many establishments, where no effort is made to prevent solid matters entering the suction pipe.

But there is a method of scientifically testing the efficiency of pumps, and that is by the indicator diagram. The mechanics know perfectly well how to take a diagram from a steam cylinder, but it has never occurred to them that the same methods may be applied to a water cylinder. Faults may often be revealed by taking a diagram from a cylinder, yet how many have courted this method of examination.

(To be continued.)

ON TABLES OF THE DENSITY OF AMMONIA SOLUTIONS.

BY M. H. GRÜNEBERG.

THE tables of the density of ammonia solutions in relation to their composition, give such discordant results that they cannot be employed even for the testing of commercial solutions. Such are those of Ure and Carius. (In Messrs. Weil Goetz and Desor's Treatise on "Ammoniacal Solutions and Waste Purifying Materials," p. 15). A comparative table is given of the results obtained by the various chemists who have endeavoured to determine the amount of NH_3 present by means of the density of the solutions, with the exception of that of Messrs. Lunge and Wiernik, which had not then been published.

The tables of Davy and Dalton were constructed without taking into account the change of volume which occurs when water is added to a concentrated solution of ammonia. Ure and Meissner corrected this error, but their determinations of ammonia are far from presenting the degree of precision which can now be obtained. Carius and Wachsmuth made new sets of determination, but, unfortunately, at different temperatures. That of Carius being for 14° , and that of Wachsmuth for 12° , so that comparison is impossible. The last table published has been constructed for 14° by L. Smith.

In the following table the results of a very careful set of determinations are embodied. The estimations of ammonia were made either by platinum chloride or by titration with normal acid, methyl orange being used as indicator.

TABLE OF DENSITIES OF AMMONIA SOLUTIONS AT 15° (GRÜNEBERG).

Density.	NH_3 % by weight.
0.880	35.50
0.885	33.40
0.890	31.40
0.895	29.50
0.900	27.70
0.905	26.00
0.910	24.40
0.915	22.85
0.920	21.30
0.925	19.80
0.930	18.35
0.935	16.90
0.940	15.45
0.945	14.00
0.950	12.60
0.955	11.20
0.960	9.80
0.965	8.40
0.970	7.05
0.975	5.75
0.980	4.50
0.990	3.30
0.995	2.15
1.000	1.05

Jour. Eclair. au Gaz.

THE FUNCTION OF AMMONIA IN THE NUTRITION OF PLANTS.

COMMUNICATED BY M. A. MUNTZ TO THE ACADEMIE DES SCIENCES.

THE question, In what form nitrogen is absorbed by the roots of plants has given rise to many investigations. It was first believed that the nitrogen of organic matter could contribute directly to the nutrition of plants. Baussingault, however, showed that nitrogen could only be taken up in the form of some salt of a mineral acid, and at a period already becoming remote, this property of being assimilated by plants was ascribed to salts of ammonia alone. Even Kuhlmann, after having confirmed the beneficial effect of nitrate of soda as a fertiliser, imagined that this salt was first converted into ammonia in the soil by reducing agents. This opinion held its own for a long time, even although Baussingault showed that nitrates are directly absorbed by plants.

At the present time, however, the inverse of this theory tends to prevail, and it is generally believed that the nitrogen of plants is assimilated in the form of nitrates, and that, in opposition to Kuhlmann's view, ammonia must pass through the form of nitrate before being used.

There is, as a doubt as to the true part played by ammonia, which is, however, instituted do not seem to have fully. It appears easy to solve a problem which the conditions are greatly complicated by. The good effect of ammonium

sulphate upon vegetation is established beyond a doubt, but it is difficult to ascertain whether this is due to the ammonia itself or to the nitrate formed from it in the soil. In order to determine the actual function of the ammonia, its action must be studied under conditions which do not admit of nitrification taking place.

I have carried out experiments arranged with the object of answering the question, "Can the salts of ammonia serve as nourishment to plants without previous transformation into nitrates?"

The necessary conditions may be realised by allowing plants to grow in a soil deprived of nitrates, removed from the action of the nitrifying ferment, and only containing ammoniacal salts as a nitrogenous manure.

The experiments were carried out by washing out all the nitrates from soil, taken from the fields, adding ammonium sulphate, and placing it in large pots, which were put into a stove heated to 100° , a temperature more than sufficient to kill the nitrifying ferment. The soil was, therefore, free from nitrates and nitrifying organisms. It was then necessary to guard against all casual contamination of the soil, which was done by the use of large cases, some of the sides of which were glazed, and the others replaced by filtering cloths, which allowed the air to pass, but retained all dust, germs, etc. After being sown, the grains were subjected for a short time to the temperature of boiling water, by which means any germs existing on their surfaces were destroyed. All these operations were carried out in a closed chamber, the atmosphere of which had been purified by the action of fine jets of water, and then left undisturbed.

After the introduction of the pots, the cases were placed under an open shed. The seeds were watered with sterilised water.

Vegetation was produced, therefore, in a medium deprived of nitrates, and freed from all nitrifying organisms. For the sake of comparison other cases were prepared in a similar manner, but to each was added a small quantity of earth containing the nitrifying ferment.

Two sets of experiments were, therefore, being conducted simultaneously—one with soil containing ammonia only, the other with soil containing an organism capable of nitrifying the ammonia. The investigations carried on in the years 1885-1888 have given concordant results. The examination of the sterilised earth showed that no nitrates had been formed, even at the end of several months, so that the plants grown in it can only have been able to obtain their nitrogen from the ammonium sulphate. The following numbers show the quantities of nitric acid per kilogramme of soil at the commencement and end of the experiments:—

	Earth freed from nitrifying organisms.		Earth containing nitrifying organisms.	
	Commencement.	End.	Commencement.	End.
	M grm.	M grm.	M grm.	M grm.
1	0.0	0.0	0.0	91.2
2	0.0	0.0	0.0	420.0

The plants, on the whole, grew in a satisfactory manner; maize, beans, horse-beans, and hemp, grew to a height of more than a metre. By determining the amount of nitrogen in the several plants, and subtracting that which was contained in the seeds, we can discover whether the plant has utilised the nitrogen of the ammonia. The following are some of the results obtained:—

	Nitrogen.		Difference taken up from the Ammonia.
	In the Seed.	In the Plant.	
Beans.....	37	956	914
Horse-beans ..	16	105	89
Maize.....	3	211	208
Barley	0.7	50	49.3
Hemp.....	0.5	115	114.5

The quantities are all in milligrammes.

These experiments show in the clearest manner that plants are able to directly absorb the nitrogen of ammonia through their roots, and that consequently, the nitrification of ammoniacal fertilisers is not an indispensable condition of their utility.—*L'Engrais*.

CULTIVATING LITERATURE UPON SOAP.—An enterprising American soap manufacturer gives away a book with every bar of soap that he sells. "If you bought 1,000 bars in succession you would receive a different book each time;" and, according to the advertisement, the choice ranges from "Scott and Dickens to Stevenson and Haggard." There are few popular authors who are not named in this list. Never was there such an inducement offered to people to accumulate a library. Fancy the shelves—a book alternating with a bar of soap! It is so much more attractive to be seen coming out of the grocer's with a book and a bar of soap than with a bar of soap alone. A firm of cigarette manufacturers has adopted the same "plan of campaign," and promises any one of a hundred novels to each person who sends with his (or her) full name and address, thirty "album certificates" (whatever they may be), one of which is packed in each box of the company's cigarettes.

THE FIXING OF NITROGENOUS COLOURING MATTER ON VEGETABLE FIBRES.

(FROM THE SAINT DENIS SOCIETY OF COLOURING MATTERS AND CHEMICAL PRODUCTS.)

NITROGENOUS colouring matters, both simple and complex, only possess a very slight affinity for vegetable fibres. Up to the present time nitrogenous colouring matters have been almost the only ones in use, but they have nevertheless been employed in an artificial manner by combining them with sodium carbonate, sodium chloride, sodium phosphate, etc. The new process employs them directly, after first subjecting the cotton to a preliminary process, which renders it capable of being directly dyed by nitrogenous colours. A quantity of the tissue—say a hundred yards—is passed through a bath composed of

Magnesium acetate at 30° B 50 litres.

Aluminium acetate at 15° B 50 „

Water 50 „

After drying the material is passed into:

Sulphate of zinc 5 kilogrammes.

Caustic soda 10 „

Water 100 „

On leaving the vat the stuff is washed, and then passed into the dyeing bath, made up to a strength of 2 or 4 per cent.

The temperature of the bath should be about 80°, and the dyeing should not last longer than half an hour. The various shades of from-cean and rocculin, almost all the oranges, the bordeaux, cerosine, the croceins, and the homologous benzidine colours can thus be well fixed on the cloth. The recipe given above may be varied according to circumstances. The substitution of the corresponding sulphates for the acetates of aluminium and magnesia is advantageous economically, and does not appreciably affect the results. The solution would then be made up in the following manner:—

Magnesium sulphate 15 kilos.

Alum 5 „

Water 100 litres.

In addition to this change, calcium acetate may take the place of magnesium acetate, etc., etc.

Moniteur de la Teinture.

BOILER EXPLOSION IN SCOTLAND.

ABOUT ten o'clock on Saturday night last a boiler explosion took place at Pumpherston Shale Oil Works, Midlothian, with the result that three men were killed and two injured. The boiler was one of a battery of low-pressure boilers used for supplying steam to the shale distilling retorts. It was of the double-flue Lancashire type, and the working pressure was only 5 lb. to the square inch. At the time of the explosion very few men were about the works. The boiler was blown some thirty yards from its site, and carried away two large tar tanks with their supports. A large area was strewn with bricks and broken timbers. The men killed were Edward Dempsey and John Scott, boiler firemen, and Andrew Taylor, retort fireman. Scott's body was found about thirty yards away, while Dempsey was blown to the top of some retorts about 25 ft. high, a distance of about 40 yards. Taylor was hurled through the air a long distance over the top of the retorts and across a public road. All the bodies were shockingly mutilated, and the clothing had for the most part disappeared. Several miners' houses near where Taylor's body was found had large holes knocked in their tile roofs by falling bricks, but, though all the houses were uninhabited, no one in them was injured. The two men who were hurt are recovering. The cause of the disaster is unknown. Scott and Taylor each leave a widow and three children. The accident caused great consternation in the locality.

NEW TABLE OF THE DENSITY OF AMMONIA SOLUTIONS.

By MESSRS. G. LUNGE AND T. WIERNIK.*

THE authors point out the discrepancies which exist between the various tables which have been given for determining the strength of ammonia solutions from their densities, and give a new table, constructed with all possible accuracy.

The solutions were prepared with ammonia frequently distilled from lime. The gas was absorbed by distilled water cooled by ice, very concentrated solutions being thus obtained, which were preserved at a low temperature in well stoppered bottles.

The density determinations were made by means of the pycnometer, all necessary precautions being taken to avoid loss of ammonia.

Three determinations were generally made, at 13°, 15°, and 17°. With very concentrated solutions it is impossible to make determinations above 15°. They made them at 11° and 9°, and were able to ascertain the co-efficient of dilatation of the liquid.

The solutions were subsequently titrated. For this purpose the liquid was acidified with normal sulphuric acid, the excess was determined by titration with methylorange as indicator.

The concentrated solutions were also analysed by means of mercuric chloride. They estimate the error of these determinations for strong solutions, and 0.05% for weak solutions.

The table given is constructed for 15°. When the temperature differs from this it is necessary to make a correction which is calculated by means of the co-efficients of expansion determined above. The value of this correction for an increase or decrease of one degree is given in the table for every density.

TABLE OF DENSITY OF AMMONIA SOLUTIONS AT 15°
(LUNGE AND WIERNIK.)

Density.	NH ₃ %.	1 litre contains NH ₃ in grammes.	Corrected density.
1.000	0	0	1.000
.998	0.45	4.5	0.998
.996	0.91	9.1	0.996
.994	1.37	13.6	0.994
.992	1.84	18.2	0.992
.990	2.31	22.9	0.990
.988	2.80	27.7	0.988
.986	3.30	32.5	0.986
.984	3.80	37.4	0.984
.982	4.30	42.2	0.982
.980	4.80	47.0	0.980
.978	5.30	51.8	0.978
.976	5.80	56.6	0.976
.974	6.30	61.4	0.974
.972	6.80	66.1	0.972
.970	7.31	71.9	0.970
.968	7.82	75.7	0.968
.966	8.33	80.5	0.966
.964	8.84	85.2	0.964
.962	9.35	89.9	0.962
.960	9.91	95.1	0.960
.958	10.47	100.3	0.958
.956	11.03	105.4	0.956
.954	11.60	110.7	0.954
.952	12.17	115.9	0.952
.950	12.74	121.0	0.950
.948	13.31	126.2	0.948
.946	13.88	131.3	0.946
.944	14.46	136.5	0.944
.942	15.04	141.7	0.942
.940	15.63	146.9	0.940
.938	16.22	152.1	0.938
.936	16.82	157.4	0.936
.934	17.42	162.7	0.934
.932	18.03	168.1	0.932
.930	18.64	173.4	0.930
.928	19.25	178.6	0.928
.926	19.87	184.2	0.926
.924	20.49	189.3	0.924
.922	21.12	194.7	0.922
.920	21.75	200.1	0.920
.918	22.39	205.6	0.918
.916	23.03	210.9	0.916
.914	23.68	216.3	0.914
.912	24.33	221.9	0.912
.910	24.99	227.4	0.910
.908	25.65	232.9	0.908
.906	26.31	238.3	0.906
.904	26.98	243.9	0.904
.902	27.65	249.4	0.902
.900	28.33	255.0	0.900
.898	29.01	260.5	0.898
.896	29.69	266.0	0.896
.894	30.37	271.5	0.894
.892	31.05	277.0	0.892
.890	31.75	282.6	0.890
.888	32.50	288.6	0.888
.886	33.25	294.6	0.886
.884	34.10	301.4	0.884
.882	34.95	308.3	0.882

*Translated by the Bull. Soc. Chim.

[illegible][illegible]

Legal.

YOUNG, &c., v. THE HERMAND OIL COMPANY.

ON the 1st inst. Lord Kinnear closed the record in an action at the instance of William Young, consulting chemist, residing at Priersford, Peebles, and George Thomas Beilby, chemist, residing at St. Kitts, Slateford, against the Hermand Oil Company, Limited, having its registered office at 6, Shandwick-place, Edinburgh. The action is brought in the form of a claim for count and reckoning, but is understood to raise the question of validity of patents which pursuers hold relating to the distillation of shale. Pursuers sue for count and reckoning with reference to the quantity of shale distilled or manufactured by the defenders in apparatus or retorts made or worked according to the principles of the inventions set forth in the letters patent, or for payment of £1,000. Defenders, it is stated, hold licences from pursuers for the working of these patents, and the licence requires that within ten days after 31st December in each year defenders should give pursuers a statement in writing showing the number of apparatus worked, or capable of being worked, and the number of tons of shale with which the apparatus was charged. Between March, 1886, and May, 1889, defenders were required to pay a royalty of 1½d. per ton, and thereafter by a new agreement a royalty of 2d. per ton. Pursuers further allege that the annual statement is erroneous in respect that defenders have a number of the patent retorts working besides the 120 mentioned in the statement, and upon the shale distilled in which they should have paid the royalty. In reply, defenders deny this allegation, and plead, among other things, that pursuers' statements are irrelevant, wanting in specification, and unfounded in fact.

Counsel for Pursuers—Mr. Daniell. Agents—Smith and Mason, S.S.C.

Counsel for defenders—Mr. Dickson. Agents—Drummond and Reid, W.S.

THE RAILWAY RATES INQUIRY.

THE statement made by Lord Balfour of Burleigh, says the *Manchester Guardian*, with reference to the course of procedure to be adopted in connection with the inquiry into the railway classifications and schedules may not unreasonably cause anxiety as to the probable result of the whole matter. A very definite warning has been given to the traders that if they intend to put their case effectively before the representatives of the Board of Trade, they must compress and focus their statements. The Board are anxious to bring either a bill or a report before Parliament before the end of the present session; and that this should be done, if possible, is beyond question. It is desirable in the interests of both the companies and the traders that the present state of uncertainty should be terminated at the earliest possible date; and if the inquiry is to result in revisions which will remove competitive disadvantages under which the industries and trade of the country are said to be suffering—and this is the express purpose of the Act and the inquiry to which it has led—then the sooner the revisions are made the better. But it scarcely seems possible that anything very thorough can be done. The inquiry began in the middle of last October, and the Court has scarcely yet got beyond the hearing of the case for the railway companies. In presenting their case the companies have the advantage of a certain degree of unity. They are defending classifications and schedules agreed upon beforehand; the arguments that are used on behalf of one company may with very little modification be used on behalf of all; and two or three leading officials can put the case as completely as a crowd of witnesses. The interests of the traders, on the other hand, are as varied as the articles in which they deal, and even every locality in the country may be said to have its special interest in each of these articles. If the railway case has occupied since last October, it might be assumed that the traders' case, treated on the same scale, would last through many Octobers yet to come, and it is not improbable that not a few readers have already ceased to interest themselves in the inquiry as likely to prove hopelessly protracted. Lord Balfour of Burleigh tells us that the total number of traders' witnesses proposed from various sources considerably exceeds 400. Yet, after the witnesses have been heard, it will be the duty of the Board of Trade to carry on a negotiation for an agreement with the railway companies; and if this negotiation fails, then the Board will be called upon to propose what they consider to be a "just and reasonable" classification and schedule of rates and charges. Each of these duties implies that the Board should first very carefully sift, weigh, and consider the evidence brought forward during the inquiry.

A ray of hope is, however, afforded by Lord Balfour's sketch of the kind of witness and evidence which the Court wishes to hear. The witnesses, he said in effect, must be representative, and must confine themselves to the exposition of carefully thought-out opinions bearing

on certain broad principles. Firstly, the Court wishes to get a well-understood general principle on which all classifications are based. Secondly, it asks what is the principle on which terminals are to be charged—we may add if they are to be charged at all. Thirdly, the principle of service terminals is to be based. Finally, some principle on which the rates for each classification be graduated must be enunciated. Now it may frankly be said as far as the classifications and schedules presented by the companies concerned, they do not seem to be based on any principle except the principle of making use of every possible pretext for an extra charge. From the first, the proposals of the companies appeared like a huge joke than anything else. Far from simplifying the rate-books, their effect would be to make confusion worse confounded. The companies really have only themselves to blame for being credited with having no more serious purpose than that of making any revision impossible, and protracting the inquiry with the hope that the agitation may die out and the traders ultimately be glad to content with the arrangements hitherto existing, slightly modified just to save appearances. Whether, from their point of view, the companies are justified in adopting this policy must be discussed. The practical thing is that if the traders obtain any satisfactory result at all they must give heed to Lord Balfour's hint, and rather aim at putting a workable set of principles before the Court than at merely destroying the classifications and schedules of the companies or proposing modifications in detail. The Court has plainly enough intimated that, for its part, it is bent upon simplification. It, for instance, considers that eight distinct classifications are quite sufficient to permit of an equitable and tolerably uniform grouping of rates. Then there is the question of terminals. The terms presented by the companies really make it probable that the Court will require little inducement to sweep away terminal charges, except as regards very special and extra services. If terminals are allowed, however, there can be no justification for a great reduction and simplification of the rates. If terminals are not allowed, then the rates must be more varied in accordance with variation in the services beyond that of mere hauling rendered by the Company in the case of each class. The traders must make their terms—terminals with low and tolerably uniform rates on the one hand, or no terminals and a rather more complicated rate-book on the other. They should very emphatically decline to accept any proposal which are not based on these principles. Considering all things together, it is a comfort to reflect that, whatever agreement is arrived at between the Board of Trade and the companies, Parliament will have the right to veto it.

THE ALBION WATERPROOFING COMPANY (MANDLEBERG AND CO., LIMITED).

THE first annual general meeting of this company was held this morning at the Town Hall, Manchester, Mr. G. Milner, manager of the company, presiding.—The Chairman moved the adoption of the report, which showed a net profit for 1889 of £24,161. 1s. 6d., enabling the directors to recommend a dividend of 10 per cent. on the ordinary shares. He said that any anxiety which in the first year of the Company's business might have been felt had been entirely removed as they became familiar with the business, and the more they saw the more they had been satisfied that a sound and healthy business had admirably managed and conducted with remarkable ability had been handed over to the Company. After payment of dividend there remained a balance of £10,368. 4s. 8d. Of this sum the directors proposed to place £2,000. to a depreciation fund and £5,000. to a reserve fund, carrying forward £3,368. 4s. 8d.—Mr. J. R. Hampson seconded the adoption of the report, which was supported by Mr. G. C. Mandleberg and carried.—Mr. J. R. Hampson was re-elected a director. Messrs. Turquand, Young and Co., auditors.—The meeting was adjourned to a special meeting, and the name of the company changed to Mandleberg and Co., Limited.

LAKE OF ACID.—In White Island, N.Z., there is a lake with a seething, bubbling mass of muriatic acid, and as the liquid boils bubbles have their sides in shadow, reflecting a green tinge, the surface emitting an intensely noxious vapour. The island is of volcanic origin, and is destitute of animal life. There are large deposits of sulphur in it, the poorest yielding 62 per cent. of sulphur.

A NEW ALLOY has been discovered by Herr Reith, of Bockenheim, Germany, which is said to practically resist the attack of most of the alkaline solutions. Its composition is as follows:—Copper, 18 parts; tin, 2.34 parts; lead, 1.82 parts; antimony, 1 part. This is therefore, a bronze, with the addition of lead and antimony. The inventor claims that it can be very advantageously used in the machinery to replace vessels or fittings of ebonite, vulcanite, or porcelain.

Correspondence.

ANSWERS TO CORRESPONDENTS.

—We do not know any particular use for the worn rollers. We understand they are used over again with new material.

Weak bleach always settles better than strong. A quarter of a pound of to a quart of water gives a solution of 11° Tw.

1A.—Good grey sulphate of 24½ per cent. can be made with pyrites acid. divertise.

—Nothing but a dynamo would pay. It would be absurd to use batteries old type.

—We cannot advise on such matters. (2) Ask your patent agent.

r.—(1) All fixed. (2) The use of caustic soda would not pay. (3) When the ses in a gas works are carried out chemically, but not before.

We are preparing a series of articles on the subject.

Our queries are only suitable for our advertising columns.

A little learning is a dangerous thing. Read up your electrical manual

MAKER.—The matter is under consideration. It would be well for you to end your judgment in the meantime.

We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE DETERMINATION OF MOISTURE IN WOOD PULP.

To the Editor of the Chemical Trade Journal.

We are quite at one with Mr. Pattinson on the subject of estimating moisture in wood pulps. We think with him that the weight as at 212° F. is the one on which all prices should be based and calculations made. But in our communication of the 15th ult., we only dealt with the two alternatives, of which one or the other is really adopted in the trade, viz., to dry the pulp at 212° F., and a fixed percentage to obtain the air-dried weight, or to dry at 212° and allow the re-absorption of moisture in a normal atmosphere.

We advised the former course on account of the difficulty of obtaining uniform conditions for the second mode of procedure, and a little examination will show that our advice is not really at variance with

Pattinson's suggestion, for the addition of a constant figure such as recommended does not affect the value of the 212° F. dried weight as basis for the calculation of prices, etc.

We thank Mr. Pattinson for his friendly criticism,—And are

GEORGE E. DAVIS,
the Manchester Technical Laboratory. ALFRED. R. DAVIS.

LEAD POISONING AT SHEFFIELD.

THE Water Committee of the Sheffield Corporation have been engaged in an exhaustive inquiry into the facts connected with many complaints of lead-poisoning that have appeared in the local waters.

Mr. Alderman Gainsford, Chairman of the Water Committee, in making the inquiry, said that they were most anxious to ascertain the facts of the case. He supposed there was no doubt that the water in the reservoir was of such a character as to be liable to take up lead somewhat freely. None of them would wish to deny that lead-poisoning existed, but they must satisfy themselves as to its extent. The next step for inquiry was the cause of the poisoning; and, further, they tried to find out whether it was so serious a matter as to call for remedy at any cost. The third question related to the remedies that ought to be applied. He regretted that the response to the committee's request for evidence from the general public had been almost entirely without result, except so far as the medical profession were concerned, whom the committee were very greatly indebted.

Evidence was then given to the effect that there had been many cases of sickness arising from lead poisoning which were very severe; indeed, in one instance the death of the patient was attributed to this cause. The evidence of several members of the medical profession, who were examined before the committee, went to show that in some of samples of water which were analysed, lead existed to the amount of half a grain per gallon.

The preliminary investigations of the committee have been fruitful in such startling evidence on the subject of plumbism. The disclosures last week, were, indeed, of quite a sensational order, for we have seen persons been paralysed, crippled for life, and even rendered helpless from lead poisoning, arising from consumption of a soft moor-water in an unfiltered condition, from the Redmires district, whence Sheffield derives part of its supply. The odd thing is that this mines high-level supply has been in use for half-a-century without suspicion of its injurious action on lead-pipes. The fact is, however

patent that plumbism has of late years been manifesting itself in an unpleasantly rapid fashion. True it is that the percentage of consumers affected is small, but the evil, even if of comparatively small proportions, is of great intensity, and has been such as to render imperative some remedial action. The Committee find that the lead is "derived from the pipes and cisterns of the consumers," and state their preparedness to sanction practical remedial experiments. It appears that household charcoal filters are useful in removing lead, but that unless they are cleansed and recharged at frequent intervals the remedy is but temporary, and the committee are of opinion that to aim at securing the requisite conditions is to attempt the impossible. Three alternative methods are advocated—treatment of the Redmires water by the lime process; provision of filter beds; or removal of lead service pipes—and eventually the committee have resolved to give the first of these a trial, in the confident assurance that its efficacy will be realised without leading to hardening of the water, at present so much appreciated for its softness.—*Daily Graphic*.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

THE SALT UNION.

THE first ordinary general meeting of the shareholders of the Salt Union, Limited, was held at the Cannon-street Hotel a few days since, under the presidency of Lord Thurlow. In moving the adoption of the report, the Chairman said that they had been accused of raising the price of salt to an exorbitant extent; but he could not admit they had done so. They no doubt had raised the price; but he pointed out that the object of the Salt Union was to raise prices so as to save the trade from impending ruin. The present prices were not higher than in 1872 and 1873. The directors desired to alleviate the sufferings arising from subsidences in the salt districts; but they had to remember that the money they were dealing with was not their own, and they were advised that no liability attached to the Salt Union. With regard to the subsidences, the saltmakers and royalty-holders would be responsible if any persons were. The directors had decided to bore in Cheshire to see if they could not find coal, petroleum, or minerals, and believed they were on the eve of a discovery greater than the discovery of coal in Kent. Mr. Verdin seconded the motion. A discussion followed, and the chairman explained the provisions made for depreciation of stock, and promised to publish a monthly return of the business. The report was adopted.

Trade Notes.

"GASSED" IN A CHEMICAL WORKS.—While a married man, named Michael Duffy, who lives with his wife and family in Peasley Cross-lane, was working in the chlorate house at Messrs. Kurtz's Chemical Works, on the 26th ult., he was overcome by still gas, which is known among the men as "Roger." He was picked up in an unconscious state and conveyed home, where he lies in a precarious condition.

A SUBMERGED STAFFORDSHIRE COALFIELD.—At the annual meeting of the South Staffordshire and East Worcestershire Institute of Mining Engineers, at Mason College, Birmingham, on Monday, Mr. Henry Lea, in his presidential address, said the effect of the Mines Drainage Act had been to reduce the daily income of water into the mines from 48,000,000 gallons in 1873 to 17,000,000 gallons. The cost of pumping was reduced from 11d. to 4½d. per 25,000 gallons. When the underground levels were completed he anticipated the whole area would be unwatered and the 100,000,000 tons of coal liberated.

A NEW WAY OF FILLING POTS.—The E. P. Gleason Manufacturing Company, of Brooklyn, N. Y., will try a new method of filling in "batch." Over every pot is an iron tank or boiler which is constantly filled with batch and which is kept constantly warm, thereby shortening the time for melting, as the tanks are connected with each pot by a funnel-like arrangement so that it is only necessary to pull out a small trap and the batch of glass runs into the pots of its own accord. Although the idea is a good one it has not been in operation, as the mixing department is too low down in the building and difficulty is experienced in getting the batch into the tanks. To remedy this the firm is removing its sand blasting room to another portion of the building and will move the mixing rooms higher up, when the idea be then put into successful effect.—*Commoner and Glassworker.*

INTERNATIONAL EXHIBITION OF MINING AND METALLURGY, LONDON, 1890.—An International Exhibition of Mining and Metallurgy on an extensive scale, the result of a proposal which emanated from the *Mining Journal*, will be held during the forthcoming summer at the Crystal Palace, Sydenham. One-half of the surplus of the Exhibition, as certified by the auditors, is to be paid to the exhibitors *pro rata* to the amount paid by them for space occupied, and the other half is to be disposed of by the Council, either in founding a Scholarship at the Royal School of Mines, or in helping some other institution connected with Mining and Metallurgy. The Exhibition will open on 2nd July, and close on 30th September, 1890, and, besides several features of special attraction, important collections of exhibits are expected from the Colonies and foreign countries. The Honorary Secretary is Mr. Geo. A. Ferguson, editor of the *Mining Journal*, 18, Finch-lane, London, E.C., from whom prospectuses and application forms for space may be obtained.

THE WILL OF A NEWCASTLE MILLIONAIRE.—Probate of the will, dated 19th January, 1888, with codicils made the 28th March, 12th April, and 26th October, 1888, and the 15th August, 1889, of the late Mr. Christian Allhusen, of Stoke Court, Bucks, J.P., and of the Newcastle Chemical Works, who died on the 13th January, aged 84 years, and was the son of Mr. Charles Christian Frederick Allhusen, of Kiel, has been granted to the executors, Mr. Wilton Allhusen, of Newcastle-on-Tyne, chemical manufacturer, and Mr. William Hutt Allhusen, merchant, sons of the testator; Mr. Edward Horatio Neville, of Skellingthorpe, Lincolnshire, his son-in-law, and Mr. John Edward Davidson, of Newcastle-on-Tyne (secretary of the Newcastle Chemical Works Company), by whom the value of the testator's personal estate has been sworn at £1,126,852. 1s. 10d., including American railway securities valued at £140,500., stocks and bonds of foreign Governments £76,950., shares of the Newcastle Chemical Works Company £47,000., and shares and debentures of other public companies £600,000.

A NOVEL PROJECT.—When it was stated some weeks since in the newspapers that the building of a milk pipe line from a point in New York State to New York City was projected there was a rather general smile, and the matter was treated as a joke. The projectors were, however, it seems, in sober earnest. A company with a capital of 500,000 dols. has, it is announced, been formed at Middletown, N. Y., for the purpose of constructing such a line. The proposed method of forwarding the milk is in cylindrical tin cans, surrounded and propelled by water, and the promoters of the scheme assert that the time of transportation, for a distance of 100 miles, will not exceed an hour, while the profit will be about one cent. a gallon. *Fire and Water* thinks if this sort of thing goes on, we need not be surprised ere long to find New York the converging point, not only of oil, natural gas, and milk pipe lines, but of whisky ducts from the blue grass regions, and beer ducts from Cincinnati, St. Louis, and Milwaukee. The pipe manufacturers may well feel cheerful at the prospect before them.—*Scientific American.*

MISCELLANEOUS CHEMICAL MARKET

Caustic soda has been in brisk demand during the past week there is a stronger market. Price for 70's is firm at £9. 5s. 1d. for 77 per cent., £10. 15s. net. Other strengths in proportion ash also commands full prices, and has a ready outlet at 1¼ for ordinary brands, and 1½d. per deg. for refined. E powder is without material change, and prices are on 1 £5. 2s. 6d. to £5. 5s at makers' works. Chlorate of potash 4¾d. per lb. Soda crystals somewhat scarce, and price: Sulphate of copper easier in price, £25. 10s. to £26. 1d. delivery, and £23. 10s. for April. Lump and flour sulphur in position meantime, but the new company which is to deal greater part of the British production from the "Chance" process, will no doubt strengthen prices by reducing the competition. Vitriol is still in good demand in all localities. powdered arsenic is dearer. Yellow prussiate of potash sell freely and firm at 9½d. to 9¾d. per lb. Acetates of lime are in better demand, £8. 5s. to £8. 10s for brown, having been spot deliveries; prices rather easier forward. Grey scarce at £ to £14. Acetates of lead and other acetates without change. of lead slow. Carbolic acids are still quiet and in uncertain the business transacted being only for short periods as a rule acid is 4d. per lb. There is rather more demand for potash, carbonate, and muriate, and current rates are firmly maintained. Ammonia salts are generally quiet.

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	51/7½	....	50/0½
Tin	£89 15 0	....	£90 0 0
Copper	47 2 6	....	46 15
Spelter	22 5 0	....	22 15
Lead	12 12 6	....	12 7
Silver	44d.	....	44.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	15¾ 15¾	....	15¾ 15½
Mason & Barry	6½ 6½	....	6½ 6½
Tharsis	4½ 4½	....	4½ 4½
Cape Copper Co. ..	3½ 3½	....	3½ 3½
Namaqua	2 2½	....	1½ 2½
Copiapo	2½ 2½	....	2½ 2½
Panulcillo	1½ 1½	....	1 1½
New Quebrada	¾ ¾	....	¾ ¾
Libiola	2½ 8½	....	2½ 2½
Tocopilla	1/6 2/-	....	1/- 1/-
Argentella	3d. 9d.	....	3d. 9c

Market Reports.

TAR AND AMMONIA PRODUCTS.

The benzol market remains in much the same condition as reported last week. In some quarters, it is said, a change for the place in the meantime. Practically, prices of last week may be as the values of to-day. Solvent naphtha still continues in demand, and the higher price realised during the past few weeks caused the introduction into the market of many low-class grades. 1s. 10d. to 1s. 11d. may be considered as to-day's value for grade at 160, f.o.b. Creosote is moving off very freely, and the stocks on the part of producers keeps prices firm. Crude oil still an enigma. It is being absorbed as fast as produced, but cannot be raised. The pitch market continues very dull, and buyers evidently not being wishful to increase their purchases at the moment.

The sulphate of ammonia market still is in an abnormal position, however, are maintained in spite of the lower prices said to be accepted by the London makers. We hear that £11. 15s. 1d. accepted at Hull, and the same price at Leith; and though Be quoted at £11. 13s. 9d., yet outside London makes have £11. 16s. 3d. We have it, however, on good authority, Wednesday a considerable quantity of sulphate was sold for delivery at Hull at £11. 17s. 6d., usual terms and conditions, those manufacturers who have been accepting lowest mon certainly been selling their production below the market price day. Dealers still continue to depress values, but there are requirements to be filled, which is evidenced by the fact of the

th which parcels offered by makers are absorbed. We consider values to be £11. 17s. 6d. f.o.b. Hull, £11. 15s. Leith, and 2s. 6d. Liverpool.

REPORT ON MANURE MATERIAL.

There has been much more inquiry, and decidedly more business both in phosphoric and ammoniacal manure material, though have not experienced any great fluctuation. Proximity of consumption, no doubt, accounts for this better feeling, and we think that some advance in prices may not unlikely be scored all within the next week or two.

There have no alteration to report in values of mineral phosphates. For Charleston River rock have been made for summer shipment 1. per unit, and in some quarters rather more than that is asked. For Charleston Land rock 10d. per unit, cost, freight, and once to United Kingdom might, perhaps, be business. We still of large business in Somme and Belgian for Continental consumption, but so far as is reported only retail transactions are being for United Kingdom for immediate delivery or shipment. Prices of Canadian remain nominal, and there seems to be no disposition on the part of raisers to make sales.

There have no transactions to report in River Plate cargoes of bones, but the December shipments get nearer due, there seems to be a desire on the part of owners to effect sales. £5. 7s. 6d. and 10s., delivered United Kingdom, we should now consider nearest values for large and small cargoes respectively. Shipments from the Mediterranean have begun to offer more freely, and value of these is more than £5. to £5. 2s. 6d., ex quay Liverpool.

Considerable sales of East Indian bone meal have been made at 7s. 6d., ex quay, and that is lowest closing value. For parcels, same price is now required. Sales of crushed Kurrachee bones have been made from shipments arrived at £5. 5s., ex quay, and at present there are no more to be had at the price. For shipment, 2s. 6d. nearest value.

Within the past few days nitrate of soda has shown some improvement, owing mainly to the very heavy deliveries during the first two months of the year. We think this will turn out to be somewhat misleading, and that actual consumption will not be found to agree with actual deliveries, but in the meantime an increase in the deliveries more than 70,000 tons within two months over those within the same period last year is having its natural effect.

Superphosphates are perhaps a shade easier, there being sellers in quantity at 47s. 6d. per ton, in bulk, delivered f.o.r. at works.

We have nothing fresh to report in dried blood, quotations for the prepared remaining 11s. per unit, and 10s. 9d. being asked for River Plate ex-store. Ammonite is still quoted 9s. 6d. per unit, cash, in bags gross weight, delivered f.o.r. at works.

Together we think there is a better tone in the market than has been experienced for the last month or six weeks.

THE TYNE CHEMICAL REPORT.

TUESDAY.

A very quiet market to report this week. Bleaching powder and soda ash dull, with little business doing. Bleach has dropped 2s. 6d. and crystals 6d. per ton. Prices of soda ash and sulphate of soda well maintained. Caustic soda in good demand, with a tendency to higher prices. Makers generally are well supplied with orders for present delivery, but not much inquiry for forward business. Tons quotations are:—Caustic soda, 77%, £10. per ton for prompt delivery; bleaching powder, softwood, casks, £5. 5s.; hardwood, £5. 7s. 6d. per ton; soda ash, 48–52%, 1½d., less 5%; crys- 47s. per ton; sulphate of soda, in bulk, 32s. 6d. per ton; sulphate ground, in casks, 42s. 6d. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4¾d. per lb. for prompt, 5d. per lb. for 1; hyposulphite of soda, casks, £4. 5s. per ton; hyposulphite of soda, 1 cwt. kegs, £4. 15s. per ton; silicate of soda, 140° Tw., £4. per 100° Tw., £3. 7s. 6d., 75° Tw., £2. 10s.; pure white sulphate of soda, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of lime, £8. per ton; nitrate of baryta, crystals, £18. 10s. per ton; nitrate of soda, £19.; sulphide of barium, £5. 10s. per ton.

Mr. Spence Watson's decision with regard to the wages dispute between Messrs. C. Tennant and Partners, Limited, Hebburn, and the workmen is expected to be made known in about a fortnight's time.

On Friday last a deputation from Liverpool waited on the principal manufacturers here and discussed the question of a proposed syndicate, and, it is said, very favourable results.

The export of chemicals from the Tyne for last month, with the exception of soda crystals, show a substantial increase in tonnage over the corresponding month of 1889, viz.:—

	1889.	1890.
Alkali and soda ash	642 tons.	807 tons.
Bicarbonate soda	13 "	4 "
Bleach powder	1,446 "	2,037 "
Manure	50 "	582 "
Soda crystals	1,126 "	659 "
Sulphate of soda	135 "	342 "
Other chemicals	1,098 "	1,877 "

Total

Manufacturing coals in good demand and prices very firm. Northumberland steam small 8s. to 8s. 6d. per ton, and Durham small 9s. 6d. to 10s. per ton.

General satisfaction is felt at the decision of the Durham miners to accept the 5 per cent. advance offered by the masters. The result of the voting was as follows:—

For accepting 5 per cent.	17,251 votes.
For a strike	14,378 "
For arbitration	1,307 "

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

There has been no improvement in the inquiry after potash and soda bichromates, which continue as neglected, comparatively, as they were during the preceding fortnight, leaving makers rather anxiously on the outlook for a change. Stocks have been accumulating inconveniently. In other respects the Scotch chemicals market is about equally depressed, and, excluding caustic soda, price changes have been in buyers' favour for the most part. Crystals, ash, and refined alkali are all obtainable on slightly easier terms; and if bleach maintains last week's quotation, it is not without an effort, for the signs are all towards a further fall. Caustic soda alone stands out as conspicuously reinforced, having marked a further substantial rise in three of the qualities. There has been only slight change in the paraffin section, naphtha having come down a further step from its late elevation, now quoting at from 8d. to 8½d. only. Sulphate of ammonia spot, Leith, has not improved on last quotation and still stands at £11. 15s., with no movement in forward fixtures; but at Glasgow, for prompt West India shipment, as high as £11. 18s. 9d. was paid—a special parcel. Chief prices current are:—Soda crystals, 47s. 6d. net Tyne; alum in lump £5, less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1½d. less 7½% Tyne; caustic soda, white, 76°, £10. 15s., 70/72°, £9. 2s. 6d., 60/62° £8. 5s., and 60/62° cream, £7. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 10s., and 1 cwt. casks, £5. 15s. net Tyne; refined alkali 48/52°, 1½d., less 5% Tyne; saltcake, 32s. to 34s. 6d.; bleaching powder, £5. 5s. to £5. 10s. less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 4d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¾d., less 5% any port; nitrate of soda 8s. 1½d. to 8s. 6d.; sulphate of ammonia, spot, £11. 15s. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £26. 10s. less 5% Liverpool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8½d.; paraffin oil (burning), 6¾d. to 7d. per gallon at Glasgow; ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 10s. to £8. Last week's imports of sugar at Greenock were 29,777 bags.

THE LIVERPOOL MINERAL MARKET.

Our market still remains strong, prices continue to advance, and there is every probability of seeing figures still higher. Manganese: Arrivals are nil, stocks are almost exhausted; prices, therefore, for prompt and forward delivery have further advanced. Magnesite: unaltered; raw ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand): The strong demand continues, and prices are very firm. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have been small this week, all of which have gone into consumption, and prices are still firm, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate), steady; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate quiet; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., and specially selected lump, finest quality, £13. Iron ore continues in good demand at full prices. Bilbao and Santander firmer at 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 16s. to 20s. Purple ore, firm at last quotations. Spanish manganiferous ore sells freely, a full

prices. Emery-stone: Best brands continued to be enquired for, bringing full prices. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fuller's earth, steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda and tungsten metal continue inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High qualities in good demand, bringing full prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore firm at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese strong at advanced figures. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium, 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Prices remain without alteration. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

Gazette Notices.

The Bankruptcy Act, 1883. Receiving Orders.

DAVID GARNER (trading as D. Garner and Son), Harrow-road, London, W., oil and colour man.
LEON HARRIS, Plasket-lane, Upton Park East, London, varnish and colour manufacturer, and oil and glass merchant.
HARRY SHAW, High-street, Poplar, London, oil and colour man.

First Meetings and Public Examinations.

HENRY WILLIAM AUSTIN (formerly trading as Austin and Son), late of Aston, near Birmingham, drysalter, first meeting March 5, 25, Coleman-row, Birmingham; public examination, March 20, County Court, Birmingham.
DAVID GARNER (trading as D. Garner and Son), Harrow-road, London, W., oil and colour man, March 12, Bankruptcy Buildings, Portugal-street, Lincoln's-Inn-Fields; March 27, 34, Lincoln's-Inn-Fields, London.

Adjudications.

DAVID GARNER (trading as D. Garner and Son), Harrow-road, London, W., oil and colour man.
H. W. AUSTIN (formerly trading as Austin and Son), late of Aston, near Birmingham, drysalter.
HARRY SHAW, High-street, Poplar, London, oil and colour man.

Notices of Dividends.

W. J. ABBOTT (trading as Abbott and Co.), Pilton, paper manufacturer, first and final dividend of 10d. any day, Official Receiver's Office, Taunton.

New Companies.

ARCHER PIPE COMPANY, LIMITED.—This company was registered on the 13th inst. with a capital of £10,000, in £1. shares, to acquire two letters patent granted in 1886 and 1889 for improvements in pipe joints, and for improvements in the method of the machinery for making earthenware pipes for drainage, water, and other purposes. The subscribers are:—

Col. A. C. Hamilton, 41, Lennox-gardens	1
Isaac Williams, 5, Malborough-road, Chiswick	1
H. A. Hart, 16, Ashchurch-grove, Shepherd's-bush	1
Harry Smith, The Bourne, Chiswick, contractor	1
H. Bird, 11, Queen Victoria-street, wine merchant	1
E. H. Bayley, 142, Newington-causway	1
R. Ewing, 51, Gracechurch-street, estate agent	1

SENSITISED OPAL CARD COMPANY, LIMITED.—This company was registered on the 13th inst. with a capital of £8,000, in £1. shares, whereof 2,000 are cumulative £5. per cent. preference shares, to acquire processes invented by Friesé Green for rendering cardboard, paper, and other like substances, impervious to the action

of water and photographic chemicals, and for printing photographs by light upon cards, ivory and similar substances, and to take over the business carried on under the style of the Friesé Greene Photographic Manufacturing Company. The subscribers are:—

Friesé Greene, 92, Piccadilly, photographer	1
P. C. Novelli, 4, Eastcheap, merchant	1
Gordon Cox, 50, Gracechurch-street, solicitor	1
Harold Laforce, 50, Gracechurch-street, solicitor	1
Thos. Cave, 50, Gracechurch-street, solicitor	1
F. S. McMaster, 50, Gracechurch-street, solicitor	1
F. W. Darch, Heber-road, Dulwich, clerk	1

TYNE DRY SALTER AND PACKING COMPANY, LIMITED.—This company registered on the 26th ult. with a capital of £2,000, in £10. shares, to put business of drysalter and manufacturer of Tyne boiler fluid, carried on by Donald, of 5 and 7, Elswick-place, Newcastle-on-Tyne, trading as Donald and Co. The subscribers are:—

G. W. Eminorsen, Newcastle, commission agent	1
W. J. Murday, Newcastle, electrical engineer	1
S. Kent, Newcastle, master mariner	1
R. Donald, Cullercoats, drysalter	1
R. Thompson, Backworth, engineer	1
G. Proud, Newcastle, agent	1
G. Dixon, Newcastle, agent	1

WILLIAMS, FRY, AND COMPANY, LIMITED.—This company was registered the 21st ult., with a capital of £20,000, in £5. shares, to take over as a going concern the business of Portland cement manufacturers, carried on by Art Williams, and Stephen Henry Fry, at Greenhithe, Kent, under style of Fry, and Co. The subscribers are:—

A. J. Williams, Stone, Greenhithe, cement manufacturer	1
B. H. Fry, Stone, Greenhithe, cement manufacturer	1
Lieut.-Col. F. C. Goad, 15, Harlington-road, Ealing	1
J. O. Collier, 59 and 60, Chancery-lane, clerk	1
J. W. Davies, 34, Guildford-street, W.C., accountant	1
R. W. Vaughan, C.F., 64, Broad-street-avenue	1
W. M. Bemister, Broad-street-avenue, clerk	1

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis.
Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Furnace Fronts and Fittings. J. J. Meldrum and T. F. Meldrum February 17.
Pumps. J. G. Elliott. 2,521 February 17.
Borax and other Borates. The Borax Co., Limited. 2,526. February 17.
Regulation of the Carbons in Arc Lamps. O. Cornwell. 2,527. February 17.
Low Water Indicators for Steam Boilers.—(Complete Specification) Toovey. 2,528. February 17.
Recovery of Metal from Iron Scrap. C. Thompson. 2,533. February 17.
Man-hole Covers for Sewer Ventilators. F. Bird. 2,541. February 17.
Sewer Ventilators. F. Bird. 2,542. February 17.
Water Jacketed Blast Furnaces. J. W. Chenhall. 2,544. February 17.
Gunpowder from Nitrocellulose. J. Y. Johnson. 2,547. February 17.
Gas Stoves.—(Complete Specification). C. Clamond. 2,551. February 17.
Ventilators for Rooms. H. Sharp. 2,557. February 17.
Carburetted Apparatus. H. S. Maxim and G. S. Sedgwick. 2,559. February 17.
Disinfecting Sewers. S. F. Milligan and R. Barklie. 2,563. February 17.
Lubricating Bearings. E. W. Cooper. 2,576. February 18.
Electrical Transmitter and Receiver. J. R. Fraser. 2,578. February 18.
Obtaining Fresh Water from Salt Water. J. Smith. 2,581. February 18.
Valve Apparatus for Gas Motor Engines. J. Fielding. 2,587. February 18.
Mechanism for Charging Furnaces.—(Complete Specification). Haddan. 2,618. February 18.
Preservation of Food. F. Crognat. 2,620. February 18.
Electrically-driven Fans.—(Complete Specification). H. G. Watel. February 18.
Regenerative Gas Lamps.—(Complete Specification). T. Gordon. February 18.
Opalescent Glass or Enamel. C. Huelser. 2,626. February 18.
Apparatus for the Production of Magnesium Flash-light. A. J. 2,628. February 18.
Centrifugal Filters. W. P. Thompson. 2,632. February 18.
Treatment of Ammonium Chloride with Alkali Waste. J. Leith February 18.
Hot Air Engines. C. Wells. 2,642. February 18.
Air Engines or Motors.—(Complete Specification). H. H. Lake. February 18.
Electric Meters. S. Z. de Ferranti. 2,653. February 18.
Electric Cables. J. E. Kingsbury. 2,654. February 18.
Insulating Electric Wires. J. E. Kingsbury. 2,655. February 18.
An Improved Pinch Cock. P. Braham. 2,658. February 19.
Spray Apparatus. E. Embrey and E. Parry. 2,664. February 19.
Gas Motor Engines. H. Campbell. 2,670. February 19.
Photo-metric Apparatus. W. Foster. 2,671. February 19.
Ventilating and Dust-catching Apparatus. G. M. Parkinson and kinson. 2,680. February 19.
Utilising Waste Product for Electrical Purposes. A. W. Ar 2,687. February 19.
A Steam Engine Governor.—(Complete Specification). J. W. Brown W Sutcliffe. 2,691. February 19.
Ventilating and Refrigerating. H. J. Haddan. 2,695. February 19.
Smoke Consuming Apparatus. W. C. Wood and C. Whitaker February 19.
Treating Coal and Coke with Limestone or Gypsum for im Combustion. A. Moseley. 2,745. February 19.
Compressed Coal and Coke Block Fuel. A. Moseley. 2,746. February 19.
Lighting Railway Trains by Electricity. J. A. Timmis. 2,759. February 19.
Dyeing Textile Fibres. W. L. Wise. 2,763. February 19.
Manufacture of Projectiles. R. Cail. 2,765. February 19.
Percussion Fuses. H. A. Schlund. 2,769. February 19.
The Separation and Recovery of Gold. E. L. Mayer and J. C. 2,772. February 19.

atus for Burning Oils. G. Gerrard. 2,777. February 19.
 ry Fans or Blowers. H. Pidot. 2,778. February 19.
 Economisation of Fuel. H. J. Wilson. 2,789. February 21.
 ufacture of White Lead. W. Noad. 2,808. February 21.
 ographic Cameras. O. Freeworth. 2,812. February 21.
 ast Collector and Steam Trap. G. Kiefer. 2,818. February 21.
 trolytic Solution for Galvanic Batteries.—(Complete Specification). C.
 itcke. 2,817. February 21.
 Treatment of Straw, Esparto Grass, and other Fibrous Materials.
 L. Applegarth. 2,832. February 21.

Hank Dyeing Machinery. J. E. Dyson. 2,837. February 21.
 Water Guages. J. A. Hopkinson and J. Hopkinson. 2,839. February 21.
 Dynamo Armatures.—(Complete Specification). L. B. Atkinson. 2,844.
 February 21.
 Syphon Cisterns. M. Syer. 2,858. February 22.
 Steam Generators. J. M. Newton. 2,872. February 22.
 Feed-water Purifiers. J. F. A. Schnarrendorf. 2,887. February 22.
 Manufacture of Cement. W. Joy. 2,896. February 22.
 Brick and Tile Making. P. Bawden. 2,900. February 22.
 An Electric Indicator for Revolving Speeds. 2,905. February 22.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending Feb. 26th.

State of Lime—

S., £224 Johnson & Hooper
 350 Lister & Biggs

Acetic Acid—

Germany, 9 pkgs. G. Meyer & Co.
 Holland, 50 pkgs. Beresford & Co.

Limony Ore—

Wdney, 10 t. Bank of N. S. Wales
 Singapore, 10 Pillow, Jones, & Co.
 9 c. L. & I. D. Jt. Co.

Sal—

Holland, 200 c. Taylor, Sommer-
 ville, & Co.

Nes—

ape, 3 t. Hammond & Co.
 atal, 3 Flack, Chandler, & Co.
 rance, 2 c. Hernu Peron, & Co.

S., 54% A. & W. Nesbitt
 S. Wales, 13½ t. Hicks, Nash, & Co.

rance, 12 c. Hernu Peron, & Co.

Holland, 10 t. J. Lucey & Sons

rytes—

Germany, 76 cks. D. Storer & Sons
 Belgium, 22 O'Hara & Hoar

Germany, 22 T. & W. Farmiloe

Holland, 46 A. Boltz

Holland, 22 W. Harrison & Co.

Belgium, 103 A. Zumbek & Co.

" 81 W. A. Rose & Co.

" 600 A. Zumbek & Co.

Germany, 45 O'Hara & Hoar

" 76 D. Storer & Sons

Holland, 22 W. Harrison & Co.

rium Super Oxide—

Germany, £45 L. & I. D. Jt. Co.

imestone—

taly, 200 t. Northcott & Sons

rium Chloride—

Holland, £70 Petri Bros.

racic Acid—

taly, 30 pkgs. Howards & Son

emicals (otherwise undescribed)

Germany, £56 M. D. Co.

" 390 A. & M. Zimmermann

" 29 Phillips & Graves

" 369 A. & M. Zimmermann

rance, 15 C. Brumlen

taly, 25 W. Nicolson & Co.

Germany, 80 T. H. Lee

" 693 Phillips & Graves

" 330 A. & M. Zimmermann

" 35 T. H. Lee

" 127 A. & M. Zimmermann.

outhoroc—

Madagascar, 4 c. Kebbel, Son, & Co.

" India, 35 L. & I. D. Jt. Co.

" Africa, 56 Elkan & Co.

olombia, 62 Stiebel Bros.

Germany, 40 L. & I. D. Jt. Co.

" 7 W. Pope & Co.

ape, 5 Hammond & Co.

" India, 30½ E. Boustead & Co.

" 14 Kleinwort, Sons, & Co.

" Africa, 14 Kebbel, Son, & Co.

" 26 L. & I. D. Jt. Co.

am Tartar—

Holland, 23 pkgs. Middleton & Co.

taly, 35 B. Jacob & Sons

rance, 15 W. C. Bacon & Co.

" 7 B. & F. Wf. Co.

France, 4 pkgs. W. & C. Pantir

Holland, 7 B. & F. Wf. Co.

Caustic Potash—

France, 23 pkgs. Beresford & Co.

" 21 F. W. Berk & Co.

Camphor—

Japan, 315 tubs. R. Warner & Co.

" 185 Lewis & Peat

China, 219 cs. "

Caustic Soda—

Holland, 110 c. Beresford & Co.

Dyestuffs—

Italy, 100 pkgs. F. Roberts

Myrabelams

E. Indies, 320 pkgs. Marshall & French

" 667 L. & I. D. Jt. Co.

" 650 "

" 350 "

" 350 Baxter & Hoare

Indigo

E. Indies, 67 chts. J. Owen

" 71 N. S. S. Co.

" 61 W. Brandt, Sons, & Co.

" 25 L. Achard & Co.

" 178 L. & I. D. Jt. Co.

" 11 Hackett, Ausender, & Co.

W. Indies, 11 Phillips & Graves

Ceylon, 3 L. & I. D. Jt. Co.

E. Indies, 29 F. Huth & Co.

" 63 Ross & Deering

" 83 Union Lighterage Co.

" 5 Phillips & Graves

" 4 Langstaff & Co.

" 1 bx. Elkan & Co.

" 31 L. & I. D. Jt. Co.

" 254 Anderson Bros.

" 19 Parsons & Keith

" 176 T. Barlow & Bro.

" 12 Hatton, Hall, & Co.

" 17 J. Owen

" 63 F. Stahlschmidt & Co.

" 16 G. Dards

" 10 Fruhling & Goschen

" 160 L. & I. D. Jt. Co.

China, 2 cs. "

E. Indies, 3 brls. "

" 97 Benecke, Souchay, & Co.

" 24 Stansbury & Co.

" 23 Hatton, Hall, & Co.

" 20 Parsons & Keith

" 11 C. J. Hambro

" 44 Parsons & Keith

" 270 L. & I. D. Jt. Co.

" 25 Arbuthnot, Latham, & Co.

" 35 F. W. Heilgers & Co.

" 16 cs. H. Johnson & Sons

Holland, 2 Ripley, Roberts, & Co.

F. Indies, 18 L. & I. D. Jt. Co.

" 47 A. Harvey

" 41 Ernsthause & Co.

Orchella

Natal, 94 pkgs. L. & I. D. Jt. Co.

Extracts

France, 70 pkgs. B. & F. Wf. Co.

Austria, 720 A. J. Humphrey

Denmark, 43 Bailey & Leetham

Norway, 1 Johnson & Jorjensen

U. S., 50 M. D. Co.

Germany, 1 T. H. Lee

France, 20 "

Holland, 88 Burt, Boulton, & Co.

Annatto

France, 4 pkgs. Hurford & Middleton

Saffron

E. Indies, 6 pkgs. L. & I. D. It. Co.

Argols

Italy, 634 pkgs. B. Jacob & Sons

Cape, 6 Brown & Elmslie

Valonia

Greece, 50 t. T. J. & T. Powell

A. Turkey, 50 Hicks, Nash, & Co.

" 279 J. Graves

" 50 Hicks, Nash, & Co.

" 50 Anning & Cobb

Cochineal

Canaries, 167 pkgs. W. M. Smith & Son

" 8 Bruce & White

" 42 Hammond & Co.

" 14 A. Jemenez & Sons

" 80 W. H. Cole & Co.

" 19 W. M. Smith & Sons

" 31 Swanston & Co.

" 10 Johnston, Rolls, & Co.

" 25 H. R. Toby & Co.

" 6 J. Owen

" 6 Kuhner, Hendschel, & Co.

Gambler

E. Indies, 414 pkgs. L. & I. D. Jt. Co.

" 429 Brinkmann & Co.

" 13 S. Barrow & Bro.

" 190 Elkan & Co.

" 170 S. Barrow & Bro.

" 347 L. & I. D. Jt. Co.

" 171 Elkan & Co.

" 251 H. Lambert

" 356 J. H. & G. Scovell

" 387 R. & J. Henderson

" 834 Cox, Patterson, & Co.

Germany, 403 Beresford & Co.

" 178 Von der Meden Bros.

Madder

Holland, 7 pkgs. Williams, Torrey, & Co.

Tanners' Bark

Natal, 20½ t. Baxter & Hoare

Yellow Barries

A. Turkey, 3 pkgs. F. W. Bowyer & Bartlett

Cutch

E. Indies, 500 pkgs. Anderson, Weber, & Smith

Glucose—

Germany, 410 pkgs. 424 c. Herne & Co.

" 25 202 Pillow, Jones, & Co.

France, 100 100 J. Barber & Co.

U. S., 50 299 Seaward Bros.

" 20 120 M. D. Co.

" 600 600 A. Dawson

" 100 500 J. Keiller & Son

France, 1,831 1,831 W. R. Spence

Germany, 400 400 J. Barber & Co.

" 25 200 W. Balchin

" 40 44 Magee, Taylor, & Co.

U. S., 100 300 M. D. Co.

Germany, 10 pkgs. 81 cwt. M. D. Co.

" 800 800 J. F. Ohlmann

" 37 296 J. Knill & Co.

U. States, 500 500 T. C. Howell

" 40 240 Pillow, Jones & Co.

Germany, 30 249 Prop. Chamberlain's Wf.

U. States, 60 360 Props. Scott's Wf.

Germany, 37 350 J. Cooper

Germany, 12 pkgs. 80c. Dutrullo

" 25 207 Solomon & Co.

" 70 560 L. Sutro & Co.

" 100 100 T. M. Duche & Sons

" 100 100 Barrett, Tagant, & Co.

U. States, 48 450 J. Barber & Co.

Gutta Percha—

E. Indies, 740 c. J. H. & G. Fovell

" 582½ R. & J. Henderson

" 894 Kleinwort, Sons, & Co.

France, 40 Flageolet & Co.

E. Indies, 420 Kaltenbach & Schmitz

Glycerine—

Germany, £160. Beresford & Co.

Holland, 60 F. W. Hielgers & Co.

" 335 Spies, Bros, & Co.

" 70 Knight & Morris

Isinglass—

Sts. Settlements, 21 pkgs. L. & I. D. Jt. Co.

Germany, 1 pkg. Williams & Co.

Manure—

Phosphate Rock

Belgium, 30 t. Leach & Co.

" 30 Fox, Roy, & Co.

" 160 J. Gibb

France, 175 A. Hunter & Co.

Belgium, 170 Lawes Manure Co.

France, 70 Arnati & Harrison

U. S., 2,551 Wylie & Gordon

Manure (otherwise undescribed)

Germany, 6 t. T. H. Lee

" 50 F. J. Cornwall & Co.

Plumbago—
Ceylon, 100 cks. J. Forsey
" 66 Prop. Chamberlain's Wf.
" 81 Doultton & Co.
" 70 Thredder, Son, & Co.
" 30 L. & I. D. Jt. Co.
" 191 Barrow & Gibson
Holland, 11 Brown & Elmslie

Pyrites—
Spain, 400 t. G. Ward & Sons

Quinine—
Holland, £600. Kebbel, Son, & Co.
Austria, 3,500 F. W. Heilgers & Co.

Salicylic Acid—
Holland, £90. B. Morrison & Co.

Salammoniac—
Holland, £77. Barr, Moering, & Co.

Sodium Hyposulphite—
Germany, £38. Beresford & Co.

Sodium Acetate—
France, £82. Prop. Hay's Wf.
" 80 Barr, Moering, & Co.

Stearine—
France, 35 bgs. H. Hill & Sons
" 55
" 5 sks. Van Gulkerkin & Co.

Saltpetre—
Germany, 74 cks. J. Hall & Son
E. Indies, 286 bgs. Ralli Bros.
" 940 Clift, Nicholson, & Co.
Germany, 100 kgs. P. Hecker & Co.
E. Indies, 549 bgs. Hunter, Waters, & Co.
" 817 L. & I. D. Jt. Co.

Sodium Sulphate—
Holland, £25. Prop. Dowgate Dk.

Sodium Nitrate—
Germany, £33. Spies Bros & Co.

Tartars—
Italy, 97 pkgs. Thames S. Tug Co.
" 377 Seager, White, & Co.

Tartaric Acid—
Germany, 20 pkgs. O. Andrea & Co.
Holland, 8 B & F. Wf. Co.
" 4 Hernu, Peron, & Co.

Turpentine—
U. S., 2,227 brls. Nickoll & Knight

Ultramarine—
Belgium, 6 pkgs. Leach & Co.
Germany, 2 G. Steinhoff
Holland, 12 Haefner, Hilpert, & Co.
" 13 Hernu, Peron, & Co.
" 2 cks. Ohlenschlager Bros.
Germany, 6 cs. Haefner, Hilpert, & Co.
Holland, 20 cks. Hernu, Peron, & Co.

Zinc Oxide—
Germany, 40 cks. D. Storer & Sons
Holland, 260 M. Ashby
U. S., 100

LIVERPOOL

Week ending Feb. 27th.

Acids (otherwise undescribed)
Havre, 1 pkg. Cunard S. S. Co.

Acetic Acid—
Rotterdam, 10 bottls.

Boracic Acid—
Leghorn, 5 cks.

Borax—
Leghorn, 14 cks. 100 cs

Bones—
Valparaiso, 664 sks. Jones & Roberts
Alexandria, 87 bgs.
Malta, 203 t.
Valparaiso, 231 sks. G. Batchelder & Son

Bombay, 1,736 c.

Barytes—
Antwerp, 40 bgs.
Bremerhaven, 22 cks.
Rotterdam, 5

Chemicals (otherwise undescribed)
Rotterdam, 2 cks.
Frederikstad, 10
Rouen, 50
Rotterdam, 1

Cream Tartar—
Messina, 2 cs.
Genoa, 10 cks.
Patras, 3 cs. Papayanni & Jeremias

" 11 brls. A. G. Frangopulo & Co.

Spain, 5 cks. Sachse & Klemm

Constantinople, 2 bls.

Caoutchouc—
Kinsebo, 3 cks. T. Millington & Co.
" 3 bgs. Samson & de Liagre

Kinsebo, 2 cks. Taylor, Laugh-

Mussera, 3 bgs. land, & Co.
" 13 Samson & de Liagre

Ambrizette, 1 43 J. Holt & Co.

" 10 Taylor, Laughland, & Co.

" 13 J. Holt & Co.

Muculla, 75 Samson & de Liagre

Boma, 48 Daumas & Co.

Black Point, 4 cs. 1 brl. 6 cks. Pinto, Leite & Nephew

Loango, 9 cks. Edwards Bros.

Cape Lopez, 3 Daumas & Co.

Elobey, 8 J. Holt & Co.

Old Calabar, 3 brls. F. & A. Swansy

Quittah, 4 cks. A. Miller, Bro. & Co.

Salt Pond, 4 brls. S. C. Nordlinger

" 2 3 cs Fletcher & Fraser

" 1 S. & C. Nordlinger

" 1 Radcliffe & Durant

" 1 W. Griffiths & Co.

" 1 Davies, Robbins, & Co.

Assinice, 1 2 Edwards Bros. A. Verdier

" 1 Pitt, Bros. & Co.

" 1 Radcliffe & Durant

" 1 Pickering & Berthoud

" 1 W. D. Woodin

" 1 Edwards Bros.

" 1 A. Reis

" 1 J. H. Robertson

Grand Bassam, 2 bgs. Pickering & Berthoud

Accra, 4 cks. 2 cs. Davies, Robbins, & Co.

" 1 4 Palma Tradg. Co.

Lavannah, 9 brls. W. Curden & Co.

Manoh, 2 Fould, Freres, & Co.

Sulymah, 5 Bieher & Co.

Sierra Leone, 25 Pickering & Berthoud

New York, 1 cs. W. Curden & Co.

Manoas, 24 Fould, Freres, & Co.

" 85 Bieher & Co.

" 248

" 3,402

Copper Precipitate—
Pomaron, a quantity Mason & Barry

Charcoal—
Rouen, 354 bgs.

Dyestuffs—
Sumac

Mediterranean, 50 bgs. J. Kitchen

Trieste, 25 brls.

Palermo, 650 bgs.

Extracts
Havre, 38 bxs. 70 cks. Cunard S. S. Co.

New York, 5 brls.

Nantes, 130 cks. R. J. Francis & Co.

Orehalla
Colon, 8 pkgs. Matheson & Beausire

Valonia
Patras, 226 bgs. J. E. Sicopulo

" 500

Dextrine—
Hamburg, 45 bgs.

Glucose—
Rouen, 5 cks.

Hamburg, 37

Dunkirk, 100 bgs.

Philadelphia, 130 brls.

Glycerine—
Amsterdam, 10 cbys.

Rotterdam, 20 cs. 5 drms.

Fiume, 30

Pearl Ash—
Portland, 10 brls.

Potash—
Rouen, 18 drms. 61 cks.

Dunkirk, 7

Phosphate—
Antwerp, 3,000 bgs. J. T. Fletcher & Co.

Dunkirk, 2,000 sks. G. & L. Pilkington

Dunkirk, 200 t.

Belgium, 1,523 bgs.

Pyrites—
Huelva, 1,321 t. Tennants & Co.

" 1,119 Matheson & Co.

" 1,360

" 1,421 Matheson & Co.

Pitch—
Amsterdam, 13 cks.

Phosphoric Acid—
Bremerhaven, 6 cs.

Sugar of Lead—
Rotterdam, 20 cks.

Sodium Silicate—
Rotterdam, 1 ck.

Saltpetre—
Hamburg, 180 cks.

Tartar—
Messina, 2 cs.

Bordeaux, 4 cks. R. Powles

Naples, 1

Tartar Salts—
Rotterdam, 10 cks.

Tartaric Acid—
Rotterdam, 27 cks.

Ultramarine—
Rotterdam, 7 cs. 13 cks.

Trieste, 5

Zinc Oxide—
Antwerp, 75 brls. J. T. Fletcher & Co.

Hamburg, 25 cks.

New York, 100 brls.

Rotterdam, 180 cs. O. & H. Marcus

New York, 100 brls.

HULL.

Week ending Feb. 27th.

Acetic Acid—
Rotterdam, 56 pkgs. Furley & Co.

Acids (otherwise undescribed)—
Bremen, 1 ck. Steedman & Bro.

Barytes—
Bremen, 44 cks. T. W. Flint & Co.

" 23 Tudor & Sons

" 13 Hurst & Cooke

Antwerp, 210 bgs. Aire & Calder N. Co.

Chemicals (otherwise undescribed)
Bremen, 1 keg. 2 cs. Veltmann & Co.

" 1 ck. J. Pyefinch & Co.

Genoa, 5 Wilson, Sons, & Co.

Gothenburg, 3 bxs.

Antwerp, 45 pkgs.

Hamburg, 2 cs. 2 brls.

Dyestuffs—
Alizarine

Rotterdam, 48 pkgs. W. & C. L. Ringrose

" 81 Hutchinson & Sons

" 27 pkgs. 11 cks. W. & C. L. Ringrose

" 10

Extracts
Rouen, 22 cks. Rawson & Robinson

Hamburg, 20 bxs. Wilson, Sons, & Co.

Myrobolams
Bombay, 4,574 bgs.

Indigo
Amsterdam, 17 chts. W. & C. L. Ringrose

Rennet
Rotterdam, 5 cks. W. & C. L. Ringrose

Copenhagen, 2 1 cs. Wilson, Sons, & Co.

Madder
Rotterdam, 3 cks. W. & C. L. Ringrose

Glucose—
Hamburg, 10 cks. Rawson & Robinson

" 25 Woodhouse & Co.

New York, 4 69 brls. Wilson, Sons, & Co.

Hamburg, 26

Stettin, 15 530

" 35 1,200 bgs.

Hamburg, 15 Rawson & Robinson

" 13 Wilson, Sons, & Co.

Dunkirk, 10 pkgs.

Litharge—
Rotterdam, 1 ck.

Manure—
Ghent, 160 t. Wilson, Sons, & Co.

Naphthol—
Rotterdam, 3 brls. G. Lawson & Sons

Potash—
Rotterdam, 2 cs. G. Lawson & Sons

" 4 cks.

Stearine—
Antwerp, 3 cks. Bailey & Leatham

Salt—
Hamburg, 712 bgs.

Saltpetre—
Hamburg, 17 brls.

Soda—
Rotterdam, 10 cks. W. & C. L. Ringrose

Tartaric Acid—
Rotterdam, 7 cks. W. & C. L. Ringrose

" 6

Tar—
Marseilles, 20 cks. Wilson, Sons, & Co.

TYNE.

Week ending Feb. 27th

Alum Earth—
Hamburg, 18 cks. Tyne

Glycerine—
Hamburg, 4 cs.

Glucose—
Hamburg, 25 cks. Tyne

Pyrites—
Pomaron, 1,200 t. Mason

Ultramarine—
Hamburg, 4 cks.

Zinc Oxide—
Antwerp, 25 brls. Tyne

GLASGOW.

Week ending Feb. 27th

Alum—
Rotterdam, 44 cks. J. Rankine

Barytes—
Rotterdam, 193 cks.

" 22 J. Rankine

Chemicals (otherwise undescribed)—
Hamburg, 1 cs.

Dried Blood—
Rouen, 3 cs.

Dyestuffs—
Alizarine

Rotterdam, 110 cks.

" 201 J. Rankine

Extracts
New York, 100 bxs.

Nantes, 300 cks.

Madder
Bordeaux, 10 cks. J. & P. Hu

Glycerine—
Rouen, 10 cs.

Glucose—
Philadelphia, 39 brls.

Saltpetre—
Hamburg, 120 kegs. J. Poynter

Tartar—
Oporto, 2 cks. J. & P. Hu

Bordeaux, 1

Turpentine—
Savannah, 3,442 c. Rowley

Ultramarine—
Rotterdam, 1 ck. J. Rankine

" 10 cs.

Waste Salt—
Hamburg, 708 bgs.

GRIMSBY.

Week ending February 22

Glucose—
Hamburg, 17 cks.

GOOLE.

Week ending Feb. 19th

Acetate of Chrome—
Rotterdam, 2 cks.

Caoutchouc—
Boulogne, 4 cks.

Dyestuffs—
Extracts

Rotterdam, 6 cks.

Manure—
Rotterdam, 15 cks.

Dyestuffs (otherwise undescribed)
Boulogne, 12 cs. 13 cks.

Dunkirk, 2

Glucose—
Hamburg, 200 bgs. 41 cks.

Dunkirk, 220

Calais, 100

Potassium Muriate—
Rotterdam, 26 cks.

Potash—
Calais, 9 cks.

Saltpetre—
Hamburg, 12 cks. 15 kegs.

Sodium Silicate—
Rotterdam, 1 ck.

Tartar—
Rotterdam, 18 cks.

Waste Salt—
Hamburg, 40 bgs.

Zinc Oxide—
Antwerp, 30 brls.

EXPORTS OF CHEMICAL PRODUCTS

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending February 22th.

Arsenic—		
Boston, 25 t.	£340	
Hong Kong, 4 10 c.	61	
Sydney, 1	14	
Ammonium Carbonate—		
Yokohama, 5 t.	£107	
Hong Kong, 10 c.	19	
Sydney, 10 c.	18	
" 1 t. 2	33	

Ammonium Sulphate—		
Rotterdam, 5 t. 14 c.	£65	
Hamburg, 30	310	
Rotterdam, 60	720	
Cologne, 30	360	
Ghent, 20	235	
Martinique, 15 1	200	
Hamburg, 30	560	
" 121 19	£3,425	

Acetic Acid—		
Wellington, 4 t. 18 c.	£113	
Alumina Sulphate—		
Bordeaux, 5 t. 14 c.	£20	

Acids (otherwise undescribed)		
Cologne, 600 bbls.	£914	

Brimstone—		
Trinidad, 2 t. 12 c.	£23	

Carbolic Solid—		
Hamburg, 3 c.	£11	
New York, 14 c.	83	

Caustic Soda—		
Natal, 5 t. 2 c.	£11	
Auckland, 5 t. 1 c.	37	

Citric Acid—		
Antwerp, 2 t.	£261	
Cape Town, 1/4 c.	5	
Melbourne, 20 kgs.	70	
Trieste, 1	140	
Genoa, 2 5	313	
Marseilles, 2	13	
Genoa, 1 5	177	
Sydney, 10 c.	68	
Montreal, 1	35	
Amsterdam, 3 c.	21	
Karachi, 1/4	9	
Yokohama, 10	70	
Hamburg, 1	7	

Copper Sulphate—		
Genoa, 5 t.	£121	
" 14 19 c.	380	
Tarragona, 10 1	910	

Cream of Tartar—		
Townsville, 23 c.	£132	
Adelaide, 1 t. 3	111	
" 1 1	80	
Newcastle, 7	40	
Sydney, 15	79	
Nelson, 10	61	
Melbourne, 1 t. 10	160	

Carbolic Acid—		
Stettin, 25 cks.	£170	
Foochow, 150 gls.	17	

Carbolic Disinfectant—		
Sydney, 33 c.	£52	

Chemicals (otherwise undescribed)		
La Libertas, 41 pkgs.	£63	
Callao, 20	64	
Masulipatam, 14 c.	50	
Brisbane, 70	252	
E. London, 95	37	
Sydney, 50	319	
Natal, 12 kegs.	30	
Hong Kong, 9 cks.	37	
Trinidad, 15 brls.	20	
Sydney, 68	256	
Yokohama, 35	240	
" 121	179	
" 100 kegs.	192	

Copperas—		
Salonica, 18 t. 17 c.	£42	

Camphor—		
Melbourne, 5 c.	£45	

Disinfectant Liquid—		
Melbourne, 4 cks.	£32	

Guano—		
Martinique, 24 t. 13 c.	£250	
Barbadoes, 30	300	
Trinidad, 100	1,000	

Manure—		
Terneuzen, 264 t. 3 c.	£1,770	
Bordeaux, 9 17	72	
Genoa, 10 7	85	
Bordeaux, 10	200	
Dunkirk, 50	600	
Rouen, 117	730	
Penang, 5	30	

Martinique, 64 1	20	
Ghent, 50	600	
Guadeloupe, 25 13	1,483	
Timaru, 100	1,350	
Hong Kong, 30	275	
Rotterdam, 19 10	107	
Newcastle, 602	2,320	
Gothembourg, 100 3	546	
Jersey, 70	640	
Valencia, 70 11	354	
Jersey, 20	125	
Penang, 29		

Phosphorus—		
Yokohama, 10 cks. 18 c.	£373	
Hong Kong, 3	40	
Wellington, 4 1/2	50	

Potassium Oxalate—		
Antwerp, 1 t. 2 c.	£50	

Potassium Chlorate—		
Gothembourg, 10 c.	£23	

Potassium Iodine—		
Algoa Bay, 1 c.	£63	

Potassium Citrate—		
Hamburg, 7 c.	£48	

Sal ammoniac—		
Constantinople, 2 t.	£70	

Soda Crystals—		
Nelson, 5 t.	£14	
Hong Kong, 8 t. 2 c.	21	

Sulphuric Acid—		
Natal, 3 t. 16 c.	£60	
Singapore, 2 10	86	
Melbourne, 1 5	10	
Sydney, 5 cks.	12	
Natal, 1 10	16	

Sulphur—		
Calcutta, 7 t. 19 c.	£45	

Sheep Dip—		
Natal, 50 cks.	£133	
E. London, 50 500 drs.	245	
Sydney, 210 gls.	50	
Karachi, 1 t. 3 c.	24	

Soda Ash—		
Yokohama, 27 t.	£132	

Saltpetre—		
Oporto, 5 t. 18 c.	£122	
Melbourne, 1	22	

Salicylic Acid—		
Melbourne, 1 c.	£28	

Sodium Nitrate—		
Hong Kong, 1 t.	£10	

Sodium Sulphate—		
Ghent, 60 t.	£60	

Superphosphate—		
Cherbourg, 145 t.	£435	
Rotterdam, 30	300	
Martinique, 250	1,000	
Cherbourg, 300	1,180	

Tannic Acid—		
Yokohama, 5 cks.	£31	

Tartaric Acid—		
Townsville, 10 c.	£72	
Newcastle, 7	52	
Montreal, 1 t.	130	

LIVERPOOL.

Week ending Feb. 26th.

Alum—		
Seville, 7 t. 18 c. 3 q.	£40	
Calcutta, 30 9	144	
Alexandretta, 1 12	8	
Algiers, 1 12	7	
Patras, 5 6	27	
Smyrna, 6 19	35	

Alum Cake—		
Melbourne, 8 t. 15 c. 2 q.	£26	

Ammonium Murate—		
New York, 8 t. 3 c.	£202	

Ammonium Sulphate—		
Antwerp, 54 t. 10 c.	£640	
Ghent, 156	1,778	
Bordeaux, 2 10	20	
Philadelphia, 6 3 2 kegs.	69	
Antwerp, 4 19 1	57	
Valencia, 4 19 1	57	

Ammonium Carbonate—		
Genoa, 2 t.	£65	
Naples, 25	25	
Bordeaux, 2	60	

Alkali—		
Maranham, 175 cks.		

Borate of Lime—		
Rotterdam, 10 t. 1 q.	£115	

Bone Waste—		
Rouen, 6 t. 8 c.	£45	

Brimstone—		
Calcutta, 10 t. 11 c. 2 q.	£32	
Boracic Acid—		
Havre, 12 c.	£22	
Borax—		
Rotterdam, 17 c. 2 q.	£26	
Bilbao, 6	9	

Bleaching Powder—		
Antwerp, 102 cks.		
Boston, 203		
Havana, 5		
Inrail, 38		
Naples, 46		
" 25		
Rotterdam, 28		
Trieste, 18		
Vigo, 8		
Antwerp, 35		
Baltimore, 97		
Boston, 302 85 tons.		
Ghent, 153		
Montreal, 10		
Nantes, 107		
New York, 224		

Copper Sulphate—		
Barcelona, 40 t. 3 c.	£236	
Rouen, 46 6	1,152	
Santos, 1 11	61	
Barcelona, 30 15	617	
Galatz, 10 9	9	
Bordeaux, 6 3 3 q.	118	
Genoa, 10 9	213	
" 15 4 1	280	
Marseilles, 15 2 2	300	
Monte Video, 9 3 12	12	
Piræus, 8	11	
Rouen, 5 2	122	
Trieste, 4 19	112	
Bilbao, 2 2	49	
Patras, 5 7	7	
Pasages, 20	380	
Tarragona, 40 2	799	
Genoa, 137 3 2	9,526	
Halifax, 9 2 11	11	
Bilbao, 9 18 3	300	
San Sebastian, 10 18 3	400	
Bordeaux, 100 4	2,500	
" 5	130	
Tarragona, 24 17 1	370	
Trieste, 5 2	125	
Venice, 5 4 2	98	
Bombay, 6 2 8	8	
Buenos Ayres, 1 7 1	32	
Barcelona, 20 2 1	392	
Pasages, 25 1	445	
Bordeaux, 39 1	947	
Genoa, 49 2	934	
Trieste, 5 1 3	106	

Chemicals (otherwise undescribed)		
Vera Cruz, 13 brls.	£70	
Antwerp, 4 t. 15 c. 3 q.	154	
Hamburg, 2 2	8	
Bombay, 7 9 1	54	
Citric Acid—		
Valencia, 10 c.	£70	

Carbon Sulphide—		
Rio de Janeiro, 3 c.	£5	

Chrome Acetate—		
Naples, 3 c. 1 q.	£10	

Carbolic Acid—		
Genoa, 4 c.	£10	
Philadelphia, 17	87	
Hamburg, 2 t. 3 2 q.	247	
Havre, 1 4 2	140	
Genoa, 9 3	48	
St. Louis, 9 16 3	360	
Calcutta, 9 16 2	140	
New York, 6	435	
Rotterdam, 11	1,515	
Hong Kong, 11	8	

Carbon—		
Bahia, 2 c.	£7	

Copperas—		
Patras, 3 t. 1 c.	£7	
Calcutta, 15 19 1 q.	30	
Volo, 3 10	7	
Valparaiso, 12 19	28	
Hamburg, 5 11	76	

Chloride of Lime—		
Baltimore, 25 t. 5 c.	£132	
New York, 43 15	240	
Canada, 10	75	
Boston, 50 10	335	
New York, 99 15	537	

Calcium Chloride—		
Boston, 10 t. 5 c.	£21	

Caustic Potash—		
Portland, 3 t. 15 c.	£75	

Buenos Ayres, 3 7		
New York, 24 15		
" 4 13		

Cream Tartar—		
Halifax, 9 c. 2 q.		

Caustic Soda—		
New Orleans, 100 dmks.		
New York, 250 100 brls.		
Pernambuco, 40		
Portland, 50 brls.		
Rotterdam, 40		
Salena Cruz, 10		
Santander, 5		
Santos, 50		
Beville, 50		
Tarragona, 40		
Vigo, 10		
Algoa Bay, 3		
Amsterdam, 11 brls.		
Antwerp, 13		
Bahia, 90		
Barcelona, 30		
Batoum, 200		
Boston, 300		
Canada, 40		
Copenhagen, 10		
Galatz, 40		
Genoa, 55		
Maccio, 30		
Maranham, 10		
Melbourne, 30		
Alexandria, 30		
Barcelona, 75		
Boston, 323		
Calcutta, 177		
Galatz, 505		
Malaga, 30 kgs.		
New York, 1,400		
Philadelphia, 100		
Santos, 30		
Tunis, 6		

Disinfectants—		
Bombay, 2 t. 6 c.		

Dried Blood—		
Nantes, 10 t. 12 c. 3 q.		

Epsom Salts—		
Halifax, 15 brls.		
Rio Janeiro, 40 kegs.		

Glycerine—		
Philadelphia, 9 t.		

Guano—		
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Genoa, 5	1	1	185
Yokohama, 5			210
New York, 2	10		99
Boston, 2	10		99
Gothenburg, 5			100
Hio, 7	10		150
Potassium Bichromate—			
Alexandria, 5	c	2 q.	£10
Kobe, 3	t.	13	2
Vera Cruz, 12		3	13
Coruna, 4		2	9
Bilbao, 19		1	36
Pitch—			
Antwerp, 27	t.		
Cette, 962			
Sodium Silicate—			
Callao, 10	brls.		
Malta, 9	cks		
B Ayres, 7			
Carthage, 6			
Rotterdam, 10			
Soda Ash—			
Trieste, 7	cks.		
Yokohama, 127	brls.		
Baltimore, 169		164	tcs.
Barcelona, 70			
Bilbao, 65			
Boston, 64			
Canada, 10			
Lisbon, 40			
Maleira, 4			
Madrid, 50			
Maranham, 25			
New York, 73			
Seville, 50			
Singapore, 90			
Baltimore, 483			
Boston, 442	158		2,060 bgs.
B Ayres, 50			
Callao, 22	drms.		
Constantinople, 100			
Corfu, 60			
Ghent, 44	cks.		
Maranham, 40	15		
Monte Video, 100		100	cks.
Philadelphia, 198			
Rio Grande do Sul, 50			
Santos, 15			
Smyrna, 30			
Saltcake—			
Philadelphia, 37	t.	2 c.	£79
Boston, 99	8		211
Sheep Wash—			
Buenos Ayres, 33	t.	17 c.	2 q.
			£875
Sodium Nitrate—			
Seville, 12	t.	13 c.	1 q.
			£110
Malaga, 4	7	3	38
Valencia, 3	5	1	27
Alicante, 1	16	3	15
Cartagena, 11	19	2	105
Sodium Biborate—			
Hamburg, 19	t.	16 c.	3 q.
			£596
Rotterdam, 3	0	3	109
Sulphuric Acid—			
Santos, 10	cbys.		£15
Sugar of Lead—			
Santos, 1	t.	2 c.	2 q.
			£25
Stannous Chloride—			
Trinidad, 6			£275
Sulphur—			
New York, 1	t.		£17
Algoa Bay, 4	9 c.	1 q.	38
Boston, 15			70
Calcutta, 30			175
Boston, 25			108
Portland, 2			12
New York, 10	1		45
Salammoniac—			
Patras, 3	c.	1 q.	£6
Samsoun, 3	2		9
Syra, 2	3		5
Toronto, 16			28
Alexandria, 1	t.		35
Campana, 3			5
Galatz, 11			18
Smyrna, 1	12	2	56
Trieste, 2	1		70
Hio, 2	10	3	89
Saltpetre—			
Syra, 6	t.	15 c.	£144
Ceara, 1	10		23
Portland, 1	10		34
Syra, 2	19	3	66
Maccio, 2	13	2	65
Superphosphate—			
Stettin, 200	t.	2 c.	£625
Las Palmas, 20	8	2	84
Nantes, 974	bgs.		95
Sheep Dip—			
Algoa Bay, 6	t.	11 c.	2 q.
			£305
Salt—			
Savaniila, 2	t.		
Antwerp, 414			

Antigua, 3		
Bakana, 20		
Boston, 165		
H Ayres, 46		
Copenhagen, 658		
Detroit, 65		
G. Bassam, 15		
N. Orleans, 2,302		
New York, 1,500		
Opobo, 50		
Para, 339	3 c.	
Saltpond, 6		
Bakana, 20		
Bonny, 10		
B Ayres, 20		
Buguma, 25		
Cape Coast, 6½		
George's Bay, 9		
N. Orleans, 698		
O. Calabar, 100		
Port Natal, 5		
Salt Pond, 6½		
Santos, 1	2	
Valparaiso, 100		
Sodium Bicarbonate—		
Antwerp, 16	pkgs.	
Hamburg, 20	3 brls.	
Ceara, 2	cs.	
Genoa, 56	brls.	
Hamburg, 125	kegs.	
Rotterdam, 52		
Soda Crystals—		
Constantinople, 100	brls.	
Malta, 150		
Piræus, 30		
Alexandria, 30		
Boston, 250		
Calcutta, 34		
Tar—		
Bakana, 5	brls.	
Curacao, 2	cs.	
Wood Acid—		
Vera Cruz, 2	cs.	
Zinc Chloride—		
Bombay, 12	c.	1 q.
Oporto, 5	t	2
Rotterdam, 3	12	1

TYNE.

Week ending Feb. 27th.

Arsenic—		
Naples, 1	t.	19 c.
Alkali—		
Rotterdam, 18	c.	
Barcelona, 20	t.	8
Ergastria, 10		
Gothenburg, 6		
New York, 49		18
Hamburg, 13		1
Antwerp, 10		16
Antimony—		
Barcelona, 6	c.	
Alumina Sulphate—		
Odense, 16	c.	
Alum—		
Rotterdam, 10	t.	4 c.
Bleaching Powder—		
New York, 240	t.	13 c.
Rotterdam, 32		7
Odense, 2		4
Barcelona, 22		2
Gothenburg, 5		6
"		15
Libau, 79		18
New York, 151		15
Hamburg, 32		7
Antwerp, 55		14
Christiania, 30		3
Bone Ash—		
Ergastria, 1	t.	
Caustic Soda—		
New York, 100	t.	2 c.
Genoa, 37		11
Leghorn, 10		3
Hamburg, 16		
Antwerp, 10		5
New York, 150		
Horsens, 1		9
Barcelona, 30		
Libau, 43		10
Copperas—		
Odense, 10	t	14 c.
Aarhus, 2		5
Randers, 2		5
Gypsum—		
New York, 32	t.	8 c.
Litharge—		
Genoa, 11	c.	
Leghorn, 3	t	1
Hamburg, 3		15

Magnesia—

Barcelona, 10 t. 16 c.

Hamburg, 6 19

Naphthalene—

Libau, 25 t.

Potassium Chlorate—

New York, 2 t. 10 c.

Hamburg, 11

Antwerp, 2 13

Pitch—

Malmö, 10 t.

Antwerp, 15

Phosphorus—

Barcelona, 1 t. 12 c.

Paraffin Wax—

Barcelona, 5 t. 1 c.

Superphosphate—

Cherbourg, 200 t. 1 c.

Sodium Hyposulphite—

Gothenburg, 1 t. 2 c.

Soda Ash—

Gothenburg, 6 t. 13 c.

New York, 50
Rotterdam, 6		16
New York, 100		6
Hamburg, 9		7
Christiania, 5		5
Antwerp, 13		
Soda—		
Korsoer, 20	t.	16 c.
New York, 53		13
Rotterdam, 16		12
Landskrona, 50		8
New York, 59		18
Antwerp, 3		5
Sodium Chlorate—		
Rotterdam, 11	c.	
Antwerp, 10	c.	
Sodium Sulphate—		
New York, 62	t.	3 c
Tar—		
Hamburg, 20	t.	

GLASGOW.

Week ending Feb. 27th.

Ammonium Sulphate—

Demerara, 75 t. 6 c.

Antwerp, 20
		£920
		241
Alumina Sulphate—		
Melbourne, 6	t.	15½ c.
		£24
Albumen—		
Lisbon, 10		£51
Bleaching Powder—		
Melbourne, 7	t.	5½ c.
		£40
Dyestuffs—		
Indigo		
New York, 103	c.	£1,936
Madder		
Melbourne, 39½	c.	£69. 11s.
Alizarine		
Lisbon, 10		£49
Dyestuffs (otherwise und. scribed)		
Melbourne, 10		£26
Iodine—		
Genoa, 10	c.	£640
Manure—		
Trinidad, 7½	c.	£1,639
Potassium Prussiate—		
Amsterdam, 4	cks.	£58
Gothenburg, 1	t.	1½ c.
Genoa, 37½		100
Potassium Bichromate—		
Boston, 84	c.	£156
Genoa, 16	t.	5½
Nantes, 15		17½
New York, 661		1,233
Antwerp, 100		125
"		206½
Rotterdam, 36	cks.	490
Malta, 21¾	c.	38
Pitch—		
Amsterdam, 301	t.	£301
Phosphate—		
Trinidad, 10	t.	18¾ c.
Paraffin Wax—		
Genoa, 26	c.	£36
Rouen, 17½		22
Paraffin—		
Genoa, 56¾	c.	£77
Sodium Bichromate—		
Boston, 63	c.	£88
Genoa, 40	t.	5½
Rotterdam, 16	cks.	1,257
		191
Verdigris—		
Melbourne, 3¾	c.	£24

HULL.

Week ending Feb. 2

Bleaching Powder—

Drontheim, 31
	cks.	
Bone Size—		
Harlingen, 13	cks.	
Chemicals (otherwise und)		
Alexandria, 12	cs.	
Bremen, 71		
Bordeaux, 30		
Copenhagen, 4		
Christiania, 5	pks.	1
Drontheim, 11		
Genoa, 11		
Gothenburg, 11		
Ghent, 10	pks.	4
Hango, 1		
Hamburg, 16		
Libau, 68		
Lisbon, 3		
Leghorn, 8		
Marseilles, 60		
Stettin, 140	pkgs.	
Rouen, 36		
Rotterdam, 40	pks.	30
Antwerp, 9		4
Caustic Soda—		
Antwerp, 37	cs.	
Amsterdam, 20	drms.	
Bergen, 4		
Dunkirk, 18		
Genoa, 6		
Hango, 3	cks.	
Konigsberg, 17		
Dyestuffs (otherwise unde)		
Christiania, 20	cks.	
Genoa, 5		
Libau, 2	c.	
Reval, 2		
Manure—		
Aarhus, 186	t.	
Copenhagen, 16		
Dunkirk, 101		
Granville, 738	bgs.	
Ghent, 2,408		
Rotterdam, 600		
Naphtha—		
Dunkirk, 25	cks.	
Pitch—		
Antwerp, 259	t	
Dunkirk, 86		
Marseilles, 5	cks.	
Turpentine—		
Christiania, 2	cks.	
Drontheim, 2	brls.	
Gothenburg, 1	ck.	

GRIMSBY.

Week ending Feb. 22

Chemicals (otherwise unde)

Antwerp, 2
| Dieppe, 145 | pkgs. | |
| Hamburg, 2 | cs. | 5 |

GOOLE.

Week ending Feb. 19

PRICES CURRENT.

WEDNESDAY, MARCH 5, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt	7/6	&	12/6
Glacial	"	2	10	0
Arsenic, S.G., 2000°	"	0	12	9
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	"	0	0	3¼
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
" (Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1¼
Oxalic	nett	0	0	3¼
Picric	"	0	1	4
Sulphuric (fuming 50 %)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (" 150°)	"	1	8	0
" (free from arsenic, 140/145°)	"	1	10	0
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	"	0	1	2½
Arsenic, white powered	per ton	13	15	0
Alum (loose lump)	"	4	15	0
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 88° = 28°	per lb.	0	0	3
" = 24°	"	0	0	1¼
" Carbonate	nett	0	0	3½
" Muriate	per ton	23	10	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
" Nitrate	per ton	40	0	0
" Phosphate	per lb.	0	0	10½
" Sulphate (grey), London	per ton	11	17	6
" (grey), Hull	"	11	17	6
Aniline Oil (pure)	per lb.	0	0	11
Aniline Salt	"	0	0	9½
Antimony	per ton	75	0	0
" (tartar emetic)	per lb.	0	1	1
" (golden sulphide)	"	0	0	10
Barium Chloride	per ton	7	10	0
" Carbonate (native)	"	3	15	0
" Sulphate (native levigated)	"	45/-	to	75/-
Bleaching Powder, 35 %	"	5	2	6
" Liquor, 7 %	"	2	10	0
Bisulphide of Carbon	"	12	15	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	0	0
China Clay (at Runcorn) in bulk	"	17/6	to	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	6
Benzol, 90 % nominal	per gallon	0	3	10
" 50/90	"	0	3	0
Carbolic Acid (crystallised 35°)	per lb.	0	0	10
" (crude 60°)	per gallon	0	2	10
Creosote (ordinary)	"	0	0	2½
" (filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30 % @ 120° C.	"	0	1	5
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	12	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	11
Coke-oven Oils (crude)	"	0	0	2½
Copper (Chili Bars)	per ton	46	15	0
" Sulphate	"	25	10	0
" Oxide (copper scales)	"	52	0	0
Glycerine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	55	0	0
Iodine	nett, per oz.	8½	d.	to 9d.
Iron Sulphate (copperas)	per ton	1	10	0
" Sulphide (antimony slag)	"	2	0	0
Lead (sheet) for cash	"	14	0	0
" Litharge Flake (ex ship)	"	17	0	0
" Acetate (white)	"	23	5	0
" (brown)	"	18	15	0
" Carbonate (white lead) pure	"	19	0	0
" Nitrate	"	22	5	0

Lime, Acetate (brown)		£	s.	d.
" (grey)	per ton	14	0	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	6	3
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	18	0	0
" Borate (1st and 2nd)	per cwt.	60/-	&	42/6
" Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	11
" Miscible, 60° O.P.	"	0	4	9
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	23	10	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5½
" American	"	0	0	5½
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	17	15	0
" Chlorate	per lb.	0	0	4½
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
" (Caustic Potash) 75/80 %	"	21	10	0
" (Caustic Potash) 70/75 %	"	20	15	0
" Nitrate (refined)	per cwt.	1	3	6
" Permanganate	"	4	5	0
" Prussiate Yellow	per lb.	0	0	9½
" Sulphate, 90 %	per ton	9	10	0
" Muriate, 80 %	"	7	15	0
Silver (metal)	per oz.	0	3	8½
" Nitrate	"	0	2	5½
Sodium (metal)	per lb.	0	4	0
" Carb. (refined Soda-ash) 48 %	per ton	5	15	0
" (Caustic Soda-ash) 48 %	"	4	15	0
" (Carb. Soda-ash) 48 %	"	4	17	6
" (Carb. Soda-ash) 58 %	"	5	15	0
" (Soda Crystals)	"	2	15	0
" Acetate (ex-ship)	"	15	15	0
" Arseniate, 45 %	"	10	0	0
" Chlorate	per lb.	0	0	6½
" Borate (Borax)	nett, per ton	30	0	0
" Bichromate	per lb.	0	0	3
" Hydrate (77 % Caustic Soda)	per ton	10	15	0
" (74 % Caustic Soda)	"	10	7	6
" (70 % Caustic Soda)	"	9	2	6
" (60 % Caustic Soda, white)	"	8	2	6
" (60 % Caustic Soda, cream)	"	7	15	0
" Bicarbonate	"	5	15	0
" Hyposulphite	"	5	5	0
" Manganate, 25%	"	8	10	0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	4½
" Nitrite, 98 %	per ton	27	10	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7½
" Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40 %	per cwt.	2	0	0
" Sulphate (Salt-cake)	per ton	1	12	6
" (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98 %	"	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	8
" Barium, 95 %	"	0	0	8
" Potassium	"	0	0	8
Sulphur (Flowers)	per ton	6	15	0
" (Roll Brimstone)	"	6	0	0
" Brimstone: Best Quality	"	4	7	6
Superphosphate of Lime (26 %)	"	2	10	0
Tallow	"	25	10	0
Tin (English Ingots)	"	95	0	0
" Crystals	per lb.	0	0	6½
Zinc (Spelter)	per ton	22	5	0
" Chloride (solution, 96° Tw.	"	6	0	0

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Notices.

All communications for the *Chemical Trade Journal* should be addressed, and Cheques and Post Office Orders made payable to—
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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates :—

30 Words and under..... 2s. 0d. per insertion.

Each additional 10 words 0s. 6d. "

Advertisements of Situations Wanted are inserted at one-half the above rates when prepaid, viz :—

30 Words and under..... 1s. 0d. per insertion.

Each additional 10 words 0s. 3d. "

Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid, are charged at the Tariff rates, which will be forwarded on application.

TECHNICAL INSTRUCTION.

IF ever there was sufficient proof that the Technical Instruction Act is not a popular measure, and that the general public (aye, and even those whom it is supposed to benefit) do not care a jot for it, that proof may be found in the meeting that took place on Tuesday in last week at Owens College, Manchester. It was previously announced that Mr. W. Mather, M.P., would address the meeting on the question, but even the magic of Mr. Mather's name was not sufficient to draw an audience. The Technical Education Board's propagandists may well now inquire why the public, interested public—having been piped to, have not come. Why have they not listened to the voice of the charm which he charmed never so wisely?

The meeting at Owens College was a dismal failure. We say it was not even representative we shall be correct. The press was well represented, four reporters being present, but when the meeting commenced the attendance consisted of twelve souls, all told, and by the time the business was concluded the number had reached twenty-five. In spite of this want of interest, as evidenced by the paltry attendance, a resolution was put and carried, as if the world had been concerned in it, and a memorial presented upon the instructions of that resolution for submission to Manchester City Council.

We have for a long time urged against the extension of these tactics for the purpose of raising the wind by issue. To a few it is perfectly well known that there are certain institutions, like many individuals, sadly in need of hard cash, but they have not the courage to come before the public and say so in true English fashion. The money is wanted, and if it can be raised compulsorily from the taxpayers without letting them know definitely what is done with it so much the better for the memorialists. We have never yet seen any scheme formulated tending to show that the money so raised would be judiciously spent on the Technical Education zealots have any particular scheme in particular except that of supplying some particular institution with the needful. In these mercenary days we are taught to believe in the doctrine of the survival of the fittest; we are taught to believe in ordinary daily life, and that thing is not supported by the mass of the population that is necessary—that it is a sin to foster it by subsidies and artificial means.

The apathy shown by the general public to the Technical Education problem, as it at present exists before us, shows that it belongs to the class which should be left the wall to make room for some better matured scheme, and it is only now kept alive by means of such artificial artifices as have prompted these present remarks. We are by no means without experience in the needs and requirements of technical instruction in this country, and it is the greatest humiliation that we regard this measure as one which we remember that some of our most competent minds have been employed in its production.

Correspondence.

ANSWERS TO CORRESPONDENTS.

- 5.—We do not know any particular use for the worn rollers. We understand they are used over again with new material.
- Weak bleach always settles better than strong. A quarter of a pound of it to a quart of water gives a solution of 11° Tw.
- INTA.—Good grey sulphate of 24½ per cent. can be made with pyrites acid. Advertise.
- B.—Nothing but a dynamo would pay. It would be absurd to use batteries of old type.
- We cannot advise on such matters. (2) Ask your patent agent.
- IST.—(1) All fixed. (2) The use of caustic soda would not pay. (3) When the essences in a gas works are carried out chemically, but not before.
- We are preparing a series of articles on the subject.
- Your queries are only suitable for our advertising columns.
- A little learning is a dangerous thing. Read up your electrical manual.
- MAKER.—The matter is under consideration. It would be well for you to end your judgment in the meantime.

We do not hold ourselves responsible for the opinions expressed by our correspondents.

THE DETERMINATION OF MOISTURE IN WOOD PULP.

To the Editor of the Chemical Trade Journal.

I am quite at one with Mr. Pattinson on the subject of estimating moisture in wood pulps. We think with him that the weight at 212° F. is the one on which all prices should be based and calculations made. But in our communication of the 15th ult., we dealt with the two alternatives, of which one or the other is generally adopted in the trade, viz., to dry the pulp at 212° F., and a fixed percentage to obtain the air-dried weight, or to dry at 212° and allow the re-absorption of moisture in a normal atmosphere.

I advised the former course on account of the difficulty of obtaining uniform conditions for the second mode of procedure, and a little reflection will show that our advice is not really at variance with Pattinson's suggestion, for the addition of a constant figure such as recommended does not affect the value of the 212° F. dried weight as is for the calculation of prices, etc.

I thank Mr. Pattinson for his friendly criticism.—And are
 GEORGE E. DAVIS,
 Manchester Technical Laboratory. ALFRED. R. DAVIS.

LEAD POISONING AT SHEFFIELD.

The Water Committee of the Sheffield Corporation have been engaged in an exhaustive inquiry into the facts connected with many complaints of lead-poisoning that have appeared in the local districts.

Alderman Gainsford, Chairman of the Water Committee, in making the inquiry, said that they were most anxious to ascertain the facts of the case. He supposed there was no doubt that the water the reservoir was of such a character as to be liable to take up lead what freely. None of them would wish to deny that lead-poisoning existed, but they must satisfy themselves as to its extent. The next step for inquiry was the cause of the poisoning; and, further, they endeavored to find out whether it was so serious a matter as to call for remedy at any cost. The third question related to the remedies that were to be applied. He regretted that the response to the committee's request for evidence from the general public had been almost entirely without result, except so far as the medical profession were concerned, whom the committee were very greatly indebted.

Evidence was then given to the effect that there had been many cases of sickness arising from lead poisoning which were very severe; and, in one instance the death of the patient was attributed to this. The evidence of several members of the medical profession, who were examined before the committee, went to show that in some of the samples of water which were analysed, lead existed to the amount of 1 grain per gallon.

The preliminary investigations of the committee have been fruitful in obtaining startling evidence on the subject of plumbism. The diseases last week, were, indeed, of quite a sensational order, for we have seen persons been paralysed, crippled for life, and even rendered insane from lead poisoning, arising from consumption of a soft moor-water in an unfiltered condition, from the Redmires district, where Sheffield derives part of its supply. The odd thing is that this high-level supply has been in use for half-a-century without suspicion of its injurious action on lead-pipes. The fact is, however

patent that plumbism has of late years been manifesting itself in an unpleasantly rapid fashion. True it is that the percentage of consumers affected is small, but the evil, even if of comparatively small proportions, is of great intensity, and has been such as to render imperative some remedial action. The Committee find that the lead is "derived from the pipes and cisterns of the consumers," and state their preparedness to sanction practical remedial experiments. It appears that household charcoal filters are useful in removing lead, but that unless they are cleansed and recharged at frequent intervals the remedy is but temporary, and the committee are of opinion that to aim at securing the requisite conditions is to attempt the impossible. Three alternative methods are advocated—treatment of the Redmires water by the lime process; provision of filter beds; or removal of lead service pipes—and eventually the committee have resolved to give the first of these a trial, in the confident assurance that its efficacy will be realised without leading to hardening of the water, at present so much appreciated for its softness.—*Daily Graphic*.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

THE SALT UNION.

THE first ordinary general meeting of the shareholders of the Salt Union, Limited, was held at the Cannon-street Hotel a few days since, under the presidency of Lord Thurlow. In moving the adoption of the report, the Chairman said that they had been accused of raising the price of salt to an exorbitant extent; but he could not admit they had done so. They no doubt had raised the price; but he pointed out that the object of the Salt Union was to raise prices so as to save the trade from impending ruin. The present prices were not higher than in 1872 and 1873. The directors desired to alleviate the sufferings arising from subsidences in the salt districts; but they had to remember that the money they were dealing with was not their own, and they were advised that no liability attached to the Salt Union. With regard to the subsidences, the saltmakers and royalty-holders would be responsible if any persons were. The directors had decided to bore in Cheshire to see if they could not find coal, petroleum, or minerals, and believed they were on the eve of a discovery greater than the discovery of coal in Kent. Mr. Verdin seconded the motion. A discussion followed, and the chairman explained the provisions made for depreciation of stock, and promised to publish a monthly return of the business. The report was adopted.

Trade Notes.

"GASSED" IN A CHEMICAL WORKS.—While a married man, named Michael Duffy, who lives with his wife and family in Peasley Cross-lane, was working in the chlorate house at Messrs. Kurtz's Chemical Works, on the 26th ult., he was overcome by still gas, which is known among the men as "Roger." He was picked up in an unconscious state and conveyed home, where he lies in a precarious condition.

A SUBMERGED STAFFORDSHIRE COALFIELD.—At the annual meeting of the South Staffordshire and East Worcestershire Institute of Mining Engineers, at Mason College, Birmingham, on Monday, Mr. Henry Lea, in his presidential address, said the effect of the Mines Drainage Act had been to reduce the daily income of water into the mines from 48,000,000 gallons in 1873 to 17,000,000 gallons. The cost of pumping was reduced from 11d. to 4½d. per 25,000 gallons. When the underground levels were completed he anticipated the whole area would be unwatered and the 100,000,000 tons of coal liberated.

A NEW WAY OF FILLING POTS.—The E. P. Gleason Manufacturing Company, of Brooklyn, N. Y., will try a new method of filling in "batch." Over every pot is an iron tank or boiler which is constantly filled with batch and which is kept constantly warm, thereby shortening the time for melting, as the tanks are connected with each pot by a funnel-like arrangement so that it is only necessary to pull out a small trap and the batch of glass runs into the pots of its own accord. Although the idea is a good one it has not been in operation, as the mixing department is too low down in the building and difficulty is experienced in getting the batch into the tanks. To remedy this the firm is removing its sand blasting room to another portion of the building and will move the mixing rooms higher up, when the idea be then put into successful effect.—*Commoner and Glassworker.*

INTERNATIONAL EXHIBITION OF MINING AND METALLURGY, LONDON, 1890.—An International Exhibition of Mining and Metallurgy on an extensive scale, the result of a proposal which emanated from the *Mining Journal*, will be held during the forthcoming summer at the Crystal Palace, Sydenham. One-half of the surplus of the Exhibition, as certified by the auditors, is to be paid to the exhibitors *pro rata* to the amount paid by them for space occupied, and the other half is to be disposed of by the Council, either in founding a Scholarship at the Royal School of Mines, or in helping some other institution connected with Mining and Metallurgy. The Exhibition will open on 2nd July, and close on 30th September, 1890, and, besides several features of special attraction, important collections of exhibits are expected from the Colonies and foreign countries. The Honorary Secretary is Mr. Geo. A. Ferguson, editor of the *Mining Journal*, 18, Finch-lane, London, E. C., from whom prospectuses and application forms for space may be obtained.

THE WILL OF A NEWCASTLE MILLIONAIRE.—Probate of the will, dated 19th January, 1888, with codicils made the 28th March, 12th April, and 26th October, 1888, and the 15th August, 1889, of the late Mr. Christian Allhusen, of Stoke Court, Bucks, J. P., and of the Newcastle Chemical Works, who died on the 13th January, aged 84 years, and was the son of Mr. Charles Christian Frederick Allhusen, of Kiel, has been granted to the executors, Mr. Wilton Allhusen, of Newcastle-on-Tyne, chemical manufacturer, and Mr. William Hutt Allhusen, merchant, sons of the testator; Mr. Edward Horatio Neville, of Skellingthorpe, Lincolnshire, his son-in-law, and Mr. John Edward Davidson, of Newcastle-on-Tyne (secretary of the Newcastle Chemical Works Company), by whom the value of the testator's personal estate has been sworn at £1,126,852. 1s. 10d., including American railway securities valued at £140,500., stocks and bonds of foreign Governments £76,950., shares of the Newcastle Chemical Works Company £47,000., and shares and debentures of other public companies £600,000.

A NOVEL PROJECT.—When it was stated some weeks since in the newspapers that the building of a milk pipe line from a point in New York State to New York City was projected there was a rather general smile, and the matter was treated as a joke. The projectors were, however, it seems, in sober earnest. A company with a capital of 500,000 dols. has, it is announced, been formed at Middletown, N. Y., for the purpose of constructing such a line. The proposed method of forwarding the milk is in cylindrical tin cans, surrounded and propelled by water, and the promoters of the scheme assert that the time of transportation, for a distance of 100 miles, will not exceed an hour, while the profit will be about one cent. a gallon. *Fire and Water* thinks if this sort of thing goes on, we need not be surprised ere long to find New York the converging point, not only of oil, natural gas, and milk pipe lines, but of whisky ducts from the blue grass regions, and beer ducts from Cincinnati, St. Louis, and Milwaukee. The pipe manufacturers may well feel cheerful at the prospect before them.—*Scientific American.*

MISCELLANEOUS CHEMICAL MARKET

Caustic soda has been in brisk demand during the past week there is a stronger market. Price for 70's is firm at £9. 5s. 6d. for 77 per cent., £10. 15s. net. Other strengths in proportion also commands full prices, and has a ready outlet at 1½d. for ordinary brands, and 1½d. per deg. for refined. Soda powder is without material change, and prices are on £5. 2s. 6d. to £5. 5s. at makers' works. Chlorate of potash 4¾d. per lb. Soda crystals somewhat scarce, and price Sulphate of copper easier in price, £25. 10s. to £26. delivery, and £23. 10s. for April. Lamp and flour sulphur in position meantime, but the new company which is to deal greater part of the British production from the "Chance" process, will no doubt strengthen prices by reducing the competition. Vitriol is still in good demand in all localities powdered arsenic is dearer. Yellow prussiate of potash sell freely and firm at 9½d. to 9¾ per lb. Acetates of lime are better demand, £8. 5s. to £8. 10s. for brown, having been spot deliveries; prices rather easier forward. Grey scarce at £14. Acetates of lead and other acetates without change. of lead slow. Carbolic acids are still quiet and in uncertain the business transacted being only for short periods as a rule acid is 4d. per lb. There is rather more demand for potash carbonate, and inuriate, and current rates are firmly in Ammonia salts are generally quiet.

METAL MARKET REPORT.

	Last week.		This week.
Iron.....	51 7½	....	50 0
Tin.....	£89 15 0	....	£90 0
Copper.....	47 2 6	....	46 15
Spelter.....	22 5 0	....	22 15
Lead.....	12 12 6	....	12 7
Silver.....	44d.	....	44

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto.....	15¾	15¾	15¾
Mason & Barry....	6½	6½	6½
Tharsis.....	4½	4½	4½
Cape Copper Co. ..	3½	3½	3½
Namaqua.....	2	2½	1½
Copiapu.....	2½	2½	2½
Panulcillo.....	1½	1½	1
New Quebrada....	¾	¾	¾
Libiola.....	2½	8½	2½
Tocopilla.....	1/6	2/-	1/-
Argentella.....	3d.	9d.	3d.

Market Reports.

TAR AND AMMONIA PRODUCTS.

The benzol market remains in much the same condition reported last week. In some quarters, it is said, a change for has commenced, but we do not see any signs of such having place in the meantime. Practically, prices of last week may as the values of to-day. Solvent naphtha still continues in demand, and the higher price realised during the past few weeks caused the introduction into the market of many low-class 1s. 10d. to 1s. 11d. may be considered as to-day's value for at 160, f.o.b. Creosote is moving off very freely, and the stocks on the part of producers keeps prices firm. Crude oil still an enigma. It is being absorbed as fast as produced, it cannot be raised. The pitch market continues very dull, and buyers evidently not being wishful to increase their purchases.

The sulphate of ammonia market still is in an abnormal position however, are maintained in spite of the lower prices said to be accepted by the London makers. We hear that £11. 15s. accepted at Hull, and the same price at Leith; and though I quoted at £11. 13s. 9d., yet outside London makes have £11. 16s. 3d. We have it, however, on good authority, Wednesday a considerable quantity of sulphate was sold delivery at Hull at £11. 17s. 6d., usual terms and condition those manufacturers who have been accepting lowest most certainly been selling their production below the market price. Dealers still continue to depress values, but there are requirements to be filled, which is evidenced by the fact of

MEETINGS OF COMPANIES.

THE MANCHESTER SHIP CANAL.—At the last meeting of the shareholders of the Manchester Ship Canal Company, Limited, the deputy chairman (Joseph Lee) stated that it was the intention of the directors to deal with the remainder of the unissued ordinary shares of the company, amounting to some £138,000, during the next few months, and that he ought to be able to safely predict that the shareholders and friends of the Ship Canal would support the directors in taking up some of those shares, thus clearing off the liability which the Board had in the matter, enabling them to issue the balance of the debentures. We are fully informed that the entire balance of the unissued ordinary shares have now been placed at par among friends of the Ship Canal without premium or discount of any kind. The whole of the share capital is now being disposed of, and the directors will be able to issue the remainder of the mortgage debentures during the present year, and in the meantime the shareholders will have the preference of allotment.

ROBURITE EXPLOSIVES CO., LIMITED.—The fourth ordinary general meeting of this company was held on Monday, at the City of London Hotel, under the presidency of Sir John Stokes. In moving the adoption of the report the Chairman stated that great progress had been made by the company during the past year, and the value of their business had increased by the business being extended to other countries. Their plant and buildings had also been improved, and the manufacturing costs had thus been reduced. The gross profit last year had been £6,205, or, adding certain special items, £7,342, compared with £1,642 in 1888; and the balance of the gross profit was for last year £4,672, against £157 for the previous year. The general expenditure has been reduced by £1,000 during the past year, and they had made a further reduction of similar amount in the current year.

Up to the 6th inst. they had received this year 161 orders and shipped 38 tons, against 30 tons in the corresponding period of last year. The receipts in this period had increased by 28 %, while the sales had fallen 24 %, owing to improvements in the manufacture. In order to extend the use of roburite they had lowered its price. They received no complaints against the article. Mr. H. W. Maynard seconded the motion. Replying to certain criticisms respecting the success of the company and the expenses, the chairman repeated that they were going on very well in the business both in South Africa and in India. As regarded the ammonia plant there had been great difficulties, but everything that could be done to remove them would be done. They had not been successful in introducing roburite into Cornwall, but it was not an explosive very well adapted to Cornish rocks, the rock being very hard. He did not think the salaries could be regarded as too high. He felt sure that in the present year would show a remarkable amount of business done. He then put the motion, which he declared carried by a majority; and the retiring directors and auditors were afterwards re-elected.

THE LEEDS FORGE COMPANY, LIMITED.—The first annual ordinary general meeting of the Leeds Forge Company, Limited, was held a few days ago at the Leeds Forge. There was a good attendance of shareholders, and the chair was occupied by Mr. JOHN SCOTT, C.B. (chairman of the company), who was supported by Mr. Samson Fox, Mr. G. W. Hastings, M.P., Mr. J. S. Walker (secretary), and others. The report, which recommends a dividend of 17½ per cent. on ordinary shares, has already appeared. The CHAIRMAN, in moving its adoption, related the shareholders on the result of the year's operations. He would observe that the directors had placed a sum of £114,15s. 3d. to the reserve fund, that being the amount of profit which had accrued for the four months ended December, 1888, but which were advised could not be treated as divisible profit. The reserve was established with the distinct understanding that it was to be of permanent character, and not to be available in future years for purposes of division among the shareholders either in dividends or bonuses. (Applause.) The directors, on the same footing, proposed that, as shown in the profit and loss account, a further sum of £500, from the transactions for 1889, these sums answering the purpose of a depreciation fund, which could at any time be written off on the other side of the account if thought desirable by the shareholders. On the formation of the company the purchase of certain assets of the old Leeds Forge sold to the new company for £564,000, included stock-in-trade and work in progress, the shareholders might think the value of that stock and work in progress, being a fluctuating asset, should be deducted from the price of £564,000, and carried to the debit of the trading account. This had been done to the extent of £25,920, 15s., leaving the value of the permanent asset at £538,079, 5s. In addition to the purchase of the new company was by agreement to pay all the liabilities of the old Leeds Forge Company except the mortgages, and to receive all the debts. The carrying out of these transactions resulted in the following figures—the liabilities were £52,222, 15s. 10d., and the debts amounted to £18,921, 2s. 1d., leaving a difference of £33,301, 13s.,

which was the cost to the company of the old company's assets, in addition to the sum of £564,000. The directors would have been justified in adding the whole of that figure of £33,301, 13s. 9d. to the £538,079, 5s., and to have treated the total, £571,380, 18s. 9d., as being the cost of the new company of the permanent assets. The course they adopted was to place so much, namely £25,920, 15s., as would bring the £538,079, 5s. back again to the £564,000, and to charge the balance, £7,380, 18s. 9d., against the trading of the year. The shareholders would thus readily see that if the £7,380, 18s. 9d. had not been charged against the year's trading, the profit might with perfect justice have been stated at £84,338, 7d. 10d. (Applause.) The business of the company had continued in a high state of activity, and there was every prospect of its being considerably augmented in the current year. There was, too, continued prosperity in the production of the specialties possessed by the company. The marine engineering trade required one of their principal specialties, and though a certain amount of slackening had taken place in the mercantile marine branch, that department of their business was still, in consequence of the operations of Her Majesty's Government, who had voted a large sum for the augmentation of the fleet, assured for the year, and they would have a large amount of work—(applause)—and he was not unsanguine as to the amount of work which the mercantile marine would supply them with. He recognised the efficient services of the staff and workmen, and moved that the report should be adopted, and a sum of £1,500, appropriated as remuneration for the services of the directors during 1889. Mr. SAMSON FOX, who was received with applause, seconded the motion, and, alluding to the erection of a special shed, covering 11,000 square yards, for the manufacture of Fox's patent pressed steel frames for rolling stock, he said that the death rate of the rolling stock, on the railways throughout the world was such as demanded the replacement, every four minutes, night and day, of at least one wagon or carriage, and they decided to put down a shed which would, equipped to the full extent, enable them to turn out a wagon at least every ten minutes. They took no unreasonable view. They were working orders for twelve different railway companies, and if they could get work from so many in so short a time there was no doubt that if they did their part more orders would come. The best railway authorities were agreed they had once more "struck oil," and got to the root of a great question. (Applause.) The resolution was adopted.—On the motion of Mr. G. W. HASTINGS, M.P., seconded by Mr. JOSEPH CRAVEN, Mr. A. S. Kirk was re-elected a director.—On the motion of Mr. REDMAYNE, seconded by Mr. WILLIAM FOX, Mr. John Gordon, jun., was re-appointed auditor, with a remuneration of 100 guineas for the year.—In reply to Mr. Leah, the CHAIRMAN said the water-gas had been used at the works for nearly two years, that it had worked with most admirable regularity, and had effected a large saving in fuel and labour. He believed that before the next meeting the water-gas plant would be doubled, if not trebled.—A vote of thanks to the Chairman and directors was passed, and the meeting terminated.

MANUFACTURING WHITE LEAD BY ELECTRICITY.

MANY attempts have been made to substitute electrolytic methods for the purely chemical ones in the manufacture of a variety of products, but thus far few have come into general use, due perhaps to lack of perseverance rather than to the impossibility of achieving the desired results. It is, therefore, with considerable satisfaction that we are able to bring to the attention of our readers a process for the electrolytic production of white lead, recently patented and put in practical operation by Mr. Turner D. Bottome, of Hoosick, N.Y., and described in a recent issue of an American contemporary.

The process devised by Mr. Bottome consists in electrolytically dissolving a lead electrode in an electrolyte containing nascent or free carbon dioxide, whereby the lead compound formed by electrolytic action is precipitated to form hydrated carbonate of lead, or pure white lead, which is then removed, washed and dried.

The manner in which this is accomplished is as follows:—The electrolytic solution is prepared by dissolving in the proportion one half-pound each of sodium nitrate and ammonium nitrate to one gallon of water, and then saturating the solution thus formed with carbon dioxide, which can be done in various ways. Sodium carbonate and ammonium carbonate may be used in the place of the nitrates; but in that case nitric acid must be added until the bath is about neutral, which results in the larger portion of the carbon dioxide being driven off during effervescence. The electrolytic solution is then placed in a tank and electrodes of metallic lead are immersed in the same. The electrodes are then connected to the generating dynamo, and a current density of about 15 amperes per square foot of anode surface is maintained. Upon the passage of such a current between the electrodes through the bath the white lead begins to fall very rapidly. As the carbon dioxide is taken up from the bath to form the hydrated car-

bonate of lead, it is, of course, necessary to have the bath replenished with additional carbon dioxide as the process continues. This can be done in several ways. A convenient way in doing this consists in burning limestone, washing the gas produced by the disassociation of the constituents of the limestone, and supplying the gas directly to the bath.

Where the electrolytic solution is made up of sodium and ammonium nitrates in water, and the solution is saturated with carbon dioxide in its free state, the reaction taking place upon the passage of the electric current, according to the inventor, are as follows:—The bath is decomposed, yielding at the anode nitrogen pentoxide, ozone and oxygen, and at the cathode sodium hydrate, ammonia and hydrogen. The lead is attacked by the powerfully-oxidising nitrogen pentoxide (N_2O_5) and ozone; but nitrogen pentoxide in the presence of water is decomposed and forms nitric acid (HNO_3). During the double decomposition which takes place nitric acid (HNO_3) and plumbic acid or hydroxide of lead, $PbO(OH)_2$, are formed. The nitric acid combines with the free ammonia and sodium hydrate to again form sodium and ammonium nitrate, while the plumbic acid is precipitated by the free carbon dioxide.

The first question raised on any invention in electro-chemistry is this: "Is it not cheaper to do the same thing by mechanical or chemical means?" But upon looking into this matter closely, one finds that the mere cost of electricity for separating or dissolving metals is comparatively slight. Mr. Bottome's calculations on this point are as follows:—

Lead is dissolved at the rate of 59.52 grains per ampère hour, and if the dissolved lead is caused to combine with some element before deposition takes place it will add to its own weight that of the element. Thus lead in combining with water and carbon dioxide gains 19.88 per cent., or nearly 20 per cent. Hence one ampère hour forms 71.35 grains of pure white lead. The counter E. M. F. of the white lead bath is from 20-100 to $\frac{1}{2}$ volt, so that the $\frac{1}{2}$ volt is required to operate one tank; one watt hour will then deposit or form 142.7 grains of white lead, or 15.2 pounds per horse power hour, or 152 pounds a day per horse power, or 27 $\frac{1}{2}$ tons per year. Figuring power at 55 dols. a year, 50 cents. a ton for the electric current would cover the making of white lead. The cost of the water entering in combination is nil, and that of the carbon dioxide also, because 575 pounds of lime rock evolve 230 pounds of the gas at a cost of 100 pounds of hard coal, leaving a by-product of 345 pounds of quicklime, which more than pays for the coal; while the 230 pounds of gas just make one ton of white lead, 170 pounds of water also entering into combination with 1,600 pounds of lead to form 2,000 pounds, or one ton.

The inventor has favoured us with a specimen of this interesting product which is in an extremely fine state of division, the result of a simple drying by spontaneous evaporation, in marked contrast to the white lead obtained by the old acetic acid process, which has to be ground mechanically before it can be used.—*Invention.*

THE MANURIAL EFFECT OF NITRATE OF SODA COMPARED WITH THAT OF SULPHATE OF AMMONIA.

THE relative values of two of the most important fertilisers, nitrate of soda and sulphate of ammonia, have often been discussed in connection with experiments which have been made on the growth of grain. Sulphate of ammonia is always a higher price per ton than nitrate of soda, but the nitrate contains a smaller percentage of nitrogen. It does not, however, follow that the results obtained are in proportion to this percentage. There are many circumstances which have to be considered. Nitrate of soda produces more straw than sulphate of ammonia; hence, when straw is a saleable article, this point is to be considered by the farmer in the selection of his manure.

According to Mr. Warrington the nitrate apparently liberates the ash constituents of the soil, rendering them available to the growing crop to a far greater extent than is accomplished by ammonia salts. Again, nitrate of soda is more suitable for use upon the land in a very dry than in a wet season, for the simple reason that it is extremely soluble and easily carried through the soil by rain. The wheat experiment at Woburn showed this most distinctly in the year 1882, which was a wet year; the nitrate producing 26 bushels and the ammonia salts 32 bushels per acre. In the dry season of 1887 the figures were reversed, for the nitrate produced 35 bushels and the ammonia 26. A similar disproportion occurred in the wheat which was manured by the two manures, with the addition of ash constituents and also when they received double quantities of each fertiliser. Therefore, although it is important to gauge the nature of the season, the farmer will use his judgment as far as he can, and employ nitrates in the districts where the rainfall is low, and sulphate of ammonia where it is high. It has been recommended that the sulphate should be ploughed in with the crop after broadcasting, but that the nitrate should be broadcasted, preferably in two or even three dressings. The

sulphate must not be mixed either with ashes or with basic slag, wise there may be a loss of ammonia; but it may be mixed with earth, or even with superphosphate or gypsum. During 18 experiments with barley Sir John Lawes obtained an increased $\frac{1}{2}$ of grain on the land dressed with sulphate of ammonia to the effect 86.8 per cent. as compared with what was obtained upon land with nitrate of soda. The Royal experiments at Woburn produced similar results, but there was a great difference in the yield of the experiments with wheat resulted in a somewhat similar manner, the sulphate of ammonia being equally effective with nitrate. With wheat the grain yielded by the use of sulphate of ammonia was equal to 74.8 per cent. of that yielded by the quantity of nitrogen in the form of nitrate; but at the Woburn the percentage of grain yielded was 95.7. Thus, while nitrate is most economical at Rothamsted, the sulphate answered best at Woburn. When used upon grass it was found that nitrate was far superior to ammonia salts, except in those instances where phosphatic manure and potash were added, when there was little difference between the two fertilisers. The same may be said with regard to the use of manures for potato growing. Nitrate was much more satisfactory than sulphate when both were used alone, but when potash and phosphate were added to both the difference was but trifling. When used upon mangold, however, nitrate of soda is infinitely superior to ammonia, whatever connection it is given. It is now generally recommended, bearing these experiments in mind, that, whether with grain, potatoes, or grass, phosphates should at least be added, and with potatoes in particular potash also. It does not appear, however, to be so necessary to use the mineral manures with nitrate as with sulphate of ammonia, for, as previously remarked, the nitrate appears to have greater influence in making the natural mineral fertilisers of the soil available for the use of plant life.

THE POLLUTION OF THE RIVERS MERSEY AND IRWELL.

A LETTER from the Local Government Board was laid before the Council in which information was asked for respecting a memorial presented by the Council for the formation of a joint committee to enforce the Rivers Pollution Act, 1876, with respect to the rivers Mersey and Irwell, and on the motion of the chairman seconded by Mr. T. W. Killick, it was resolved to send the following reply:—

"SIR,—I am now directed by the County Council for the County of Chester to reply to your letter of the 30th November last, in subject of their application for a provisional order to be made to constitute a joint committee, representing the several administrative counties on the watersheds of the rivers Irwell and Mersey for enforcing the provisions of the Rivers Pollution Prevention Act, 1876, and with reference to the several points in your aforesaid letter on which you ask for information I beg to state as follows:—1. The grounds on which the application is made are that the rivers Irwell and Mersey and their tributaries, in consequence of pollution by sewage and the refuse from manufactories and other places, are offensive both to smell and to sight, and are often injurious to health. Within two years it is expected that the Manchester Ship Canal will be filled with water from these rivers and their tributaries. The Ship Canal will not be a continuous stream but a succession of ponds with a stream running through them. The danger to health arising from those rivers will be undoubtedly increased. The Cheshire County Council are concerned directly with the state of the waters of the Manchester Ship Canal, as it is either through or by a large number of townships in the county of Cheshire and also indirectly, as the communication between Manchester, Salford and Cheshire is so great and continuous that the outbreak of any epidemic in those cities would certainly spread through portions of the county of Chester. There are more than 70 authorities in the watersheds of the Mersey and Irwell, and only one-half of this number have completed any arrangements for the construction of sewage works. From the above statement it is evident that it is necessary that further steps should be taken to enforce the Rivers Pollution Prevention Act, 1876, and it appears to the Council that this will best be done by a joint committee appointed under section 3 of section 14 of the Local Government Act, 1888. The appointment of such a joint committee would enable local authorities to act together and in unison, and in many cases by the substitution of one large body in the place of two or three smaller ones money would be saved, and in other cases friction would be avoided, as it is understood several authorities have complained of want of common action. The advantage of a joint committee would also, it is conceived, be great in dealing with the pollution of streams by manufacturers. While it is desirable that the waters of the Mersey and Irwell shall be pure and not undesirable that the industries which have grown up on their

should be damaged or destroyed, and the employment of labour be thereby curtailed or stopped. It is also most undesirable that the manufacturers within the area of one Authority should be dealt with differently than those within another, which, if each Authority acts separately, may result from local favour or local jealousy. It appears to the Cheshire County Council that a joint committee would be much more independent, and would treat all dwellers and manufacturers equally and justly, and would so act that the industries of this wide district should not be injured nor the real prosperity of its inhabitants prejudiced.

2. The map sent herewith shows precisely the limits of the area within which it is proposed that the Joint Committee shall have jurisdiction. The area covers the whole of the water-sheds of the Irwell and Mersey, until the tide is reached at Warrington.

3. A list of the County Councils affected:—Counties of Lancaster, Cheshire, and Derby. County boroughs of Bolton, Bury, Rochdale, Oldham, Salford, Manchester, and Stockport.—I am, sir, your obedient servant,

THOMAS ROBERTS, Deputy Clerk to the Council.
The Secretary, Local Government Board, Whitehall,
London, S.W.

THE BLAST FURNACES OF THE UNITED STATES.

The following table, showing the number of furnaces in blast and their capacities on the first of each month since January, 1886, may be of interest to our readers:—

Date.	Charcoal.		Anthracite.		Bituminous.	
	No.	Weekly Capacity.	No.	Weekly Capacity.	No.	Weekly Capacity.
1886.						
January 1	57	7,804	104	29,811	112	59,436
February 1	52	7,403	107	30,100	109	56,832
March 1	46	6,515	104	30,115	105	55,436
April 1	44	6,766	117	33,280	118	60,277
May 1	47	8,462	122	37,767	128	68,079
June 1	54	9,884	123	35,136	131	75,756
July 1	59	10,420	119	33,225	132	78,106
August 1	63	10,980	119	33,602	131	77,750
September 1	66	11,105	121	34,091	132	76,005
October 1	59	11,271	118	33,476	135	77,460
November 1	62	10,565	112	32,761	138	79,270
December 1	67	11,818	115	32,634	141	78,127
1887.						
January 1	66	11,895	126	35,633	140	80,132
February 1	68	12,235	137	38,099	148	85,021
March 1	61	11,572	142	39,767	146	83,834
April 1	59	11,337	143	39,477	151	86,709
May 1	54	10,819	143	40,873	149	86,822
June 1	62	11,809	145	41,288	104	54,767
July 1	77	13,969	136	37,662	101	57,355
August 1	80	14,396	127	35,278	120	70,855
September 1	79	13,900	130	36,872	143	87,953
October 1	73	15,171	122	36,044	151	93,423
November 1	80	14,145	125	36,720	148	94,982
December 1	73	13,104	120	35,361	148	93,295
1888.						
January 1	73	13,237	117	35,259	151	92,224
February 1	70	13,742	103	29,689	140	83,725
March 1	62	11,713	102	29,066	129	76,800
April 1	60	12,393	95	27,971	130	75,983
May 1	60	11,956	104	30,366	133	80,230
June 1	68	13,116	101	29,859	129	80,040
July 1	68	12,753	96	28,176	119	74,743
August 1	69	13,248	92	27,846	119	77,408
September 1	68	12,623	98	28,946	132	84,513
October 1	73	12,983	99	29,586	138	87,141
November 1	75	14,005	97	28,412	141	88,273
December 1	73	13,270	107	31,052	151	94,960
1889.						
January 1	71	13,213	108	31,837	154	97,117
February 1	66	12,291	104	30,772	146	91,752
March 1	59	11,568	100	33,383	152	97,783
April 1	63	12,150	100	33,267	149	98,835
May 1	60	11,951	103	35,078	138	91,239
June 1	66	11,577	97	34,514	129	83,591
July 1	63	11,204	90	31,848	131	89,356
August 1	66	11,712	88	32,118	132	95,595
September 1	69	11,769	94	35,497	137	92,915
October 1	66	12,672	93	36,496	149	104,378
November 1	70	13,257	98	38,181	161	111,279
December 1	69	13,226	106	40,228	162	113,501
1890.						
January 1	66	12,963	111	41,964	168	120,345
February 1	61	12,653	112	45,681	166	116,798

EXTRACTS FROM THE BOARD OF TRADE JOURNAL.

THE MANUFACTURE OF MARGARINE IN SWEDEN.

A DESPATCH, dated the 7th January, has been received at the Foreign Office from Sir F. R. Plunkett, Her Majesty's Minister at Stockholm, transmitting translation of a notice published by the Royal Medical Board concerning the special measures of supervision to be adopted with regard to the manufacture of margarine. The following is a copy of the translation in question:—

By the fourth paragraph of the law of October 11th, 1889, the supervision of the manufacture and sale of margarine, except when prepared merely for the use of a single household, is intrusted to a person appointed by the Governor of the province, whose duty it will be to see that the special directions of the Medical Board are carried out, and that none but perfectly pure and harmless materials are used in the preparation of the margarine. The special instructions issued by the Medical Board are as follows:—

The inspector should visit the manufactory at uncertain and unknown hours, at least on four days in every week. He must insist on the greatest possible cleanliness being observed both in the processes of manufacture and in regard to the premises, vessels, receptacles, &c.

With regard to the premises, he should make sure that the ground under and surrounding the building is kept clean and free from rubbish, scourgings, and refuse, and that the rooms of the manufactory be kept as clean as possible, floors, walls, and ceilings, and that they be kept well ventilated; that all receptacles and implements, such as tables for cleansing the tallow, tallow cutting machines, tallow mills, tubs, presses, pressing cloths, churns, basins, kneading machines, packing cases, etc., etc., be kept clean. He should see that no vessels or implements that could convey any metallic poison to the margarine be used.

As regards the workpeople, he should see that every person employed be free from contagious diseases, sores, eruptions, abscesses, boils, and similar affections; that they be very particular as to the cleanliness of their bodies, clothes, and belongings, especially their forearms, hands, fingers, and nails; that they do not take snuff, or smoke, or chew tobacco while at work. That while at work they wear a special blouse of thin material, that can easily be washed, and which must not be worn out of the factory; that a sufficient number of wash-stands, supplied with hot and cold water, soap, nail-brushes, and clean towels, be always at hand; also that antiseptic bandages and dressing be kept ready in case of injury.

He must see that any workpeople who may have been in contact with people attacked by the following diseases, viz., typhus and typhoid fever, scarlet fever, diphtheria, cholera, small-pox, dysentery, or have been in houses where such diseases exist, must have their bodies and clothes thoroughly cleansed and disinfected before being permitted to enter the factory or assist in the making of margarine.

As to the materials used, he must see that all be of good quality; that both the tallow and oleomargarine, and the vegetable oils and other fats used, be in appearance, smell, and taste, clean and fresh; that the milk added when churning be not taken from places where there are any contagious diseases; that the colouring matter and salt be of good quality, and that no poisonous colouring matter be used.

As to the manufactured article, he must see that when ready the margarine be of proper appearance, good taste, and free from disagreeable smell; that it be packed cleanly and neatly, and only in vessels formed and marked as appointed by the Law of October 11th, 1889.

Should the inspector detect any irregularity in the manufacture, he should report the matter to the Board of Health, or Prefect of the commune, and also to the Governor of the province.

PRODUCTION OF SALT IN GERMANY.

The French Ambassador at Berlin says, in a recent report, that a statement has recently been issued by the German Government on the subject of the production of salt works in Germany.

From this statement it appears that in the year 1888-89, there were produced in the Empire 15,934 tons of crystallised salt, 342,596 tons of rock-salt not crystallised, and 516,521 tons of salt produced by evaporation, the two last qualities showing an increase on the average of the last 10 years. Crystallised salt comes from the Prussian province of Saxony, rock-salt from Wurtemberg, from the province of Saxony, from Anhalt, and from Posen. The salt produced by distillation comes from the provinces of Saxony, Hanover, Alsace-Lorraine, and Thuringia.

In the course of the year 1888-89, 734,623 tons of native salt have been disposed of for the home trade, of which 349,715 tons intended for food have paid the tax of 12 marks per 100 kilos. and 384,908 tons, utilised by industry and agriculture, have been exempt from any duty.

Exports reached 134,171 tons, distributed as follows:—30,212 tons for Bremen, Hamburg, and the other parts of the empire not included

in the Zollverein; 24,567 tons to Austria-Hungary, 19,638 tons to Belgium, 19,107 tons to Holland, 10,514 tons to Russia, 6,534 tons to Denmark, 6,504 tons to Sweden and Norway, 6,444 tons to the British Indies, 5,100 tons to England.

Exported salt does not pay any duty.

Imports were 28,057 tons, of which 25,265 tons were of origin.

Foreign salt introduced through the ports pay an import duty equal to the tax. That imported by land routes pays 12.80 marks per 100 kilos.

The average consumption is 7.8 kilos. per inhabitant in the whole Zollverein.

THE INFUX OF FOREIGN CAPITAL INTO AMERICA.

ABOUT eighteen months ago, investments of foreign capital, particularly that of British capital, began to be made in American commercial enterprises.

This investment was suggested and stimulated by the organisation of a corporation which "syndicated" the sale of the Sir Edwin Guinness ale and stout breweries, of Scotland. The surplus capital of the world's metropolis having turned such a quick penny in this speculation, immediately sought for a new field, and naturally attention was directed to this country. A thorough system of exploitation began. London and other large English municipalities have a body of highly-trained and skilful men called "chartered accountants," whose reports are accepted with implicit faith by all financial institutions in England. The task which these men had to perform was to verify the book accounts of the various institutions, take an inventory of the plants examined, and substantiate statements made in regard to business. The work of investing in American enterprises in a short time became a regular organised business. A large number of properties have been examined by these chartered accountants, and negotiated through the brokers of various syndicates. It is not one but many different organised financial associations which have taken up these properties and "floated" or "placed" them.

The result, the editor of the *Architecture and Building* believes, will be highly beneficial to the industrial interests of the country, provided the vendors keep good faith with the vendees. This provision is necessary, because the system pursued generally is to buy any given property outright, and retain some one who has been prominently connected with the business to superintend its continuance under a salary. Thus the business is conducted by experienced hands. The idea involved in the purchase on the part of the vendee is that for himself and his associates he can command a business which will pay as an investment much more than the paltry two or three per cent. which the same money will command at home. The investments taken are generally sound, substantial, thoroughly established business ventures, and the direct consequence of this influx of foreign capital, so far, has been highly beneficial. The ultimate tendency, we believe, will be to secure further investment in enterprises that need additional capital to promote further progress. We do not believe in the alleged statements of the opponents of these investments, that the ultimate outcome will be a drain on our resources to enrich a foreign bondholder, for whenever that point is reached that his interests are greater in this country than in the land of his nativity, it has generally resulted in the moving to that country of the foreign bondholder. It is a monstrous and pernicious doctrine to uphold that the foreign bondholder has been a drain upon this country's resources. On the contrary, we owe to him the means by which our resources have been brought to their present great development, and his coming should be encouraged rather than impeded.—*Scientific American*.

THREE GREAT BOILERS—The Polson Iron Works Company, of Toronto, 28th ult., shipped to Owen Sound the last of four large boilers constructed by them for the car ferry they are now building at their shipyard there for the Canadian Pacific Railway Company. These boilers are the largest ever made in Canada, and also the largest ever carried by rail on this continent. They are of the cylindrical return multitubular type, and are 13 feet 3 inches in diameter and 14 feet long, weighing 37 tons each. The shell-plates are 11-16 of an inch in thickness, and were specially rolled in Scotland. The tubes are of German manufacture, and are 4 inches in diameter, 11 feet long, and 148 in number. There are in each boiler three of Fox's corrugated furnaces, 42 inches in diameter and 10 feet 11 inches long. The Government test showed an allowance of 94 pounds working pressure. The riveting of these boilers was done by a Tweddell hydraulic riveter, with a gap of 8 feet 4 inches, lately erected in the company's shops. The boilers when completed were lifted bodily on to the cars by a large overhead travelling crane, which has a lifting capacity of 50 tons.—*American Manufacturer*.

THE "TIPPING" SYSTEM IN TRADE.

IT is characteristic of the Corporation spirit that the Recorder Central Criminal Court should be found defending from the the "tipping" system in trade, although the Legislature has penal to bribe and corrupt the servants of public bodies. The qu of gratuities has two sides, remarked Sir Thomas Chambers, b side which has impressed itself upon Parliament, and every on who has inquired into the subject and noted its effects, is the at demoralisation to which it leads. If the system is so innocen the gratuity merely a reward for honest services rendered, why is so much secrecy, or why should such mystifying methods of keeping be adopted? The occasion which gave the Recorder opportunity of uttering his sentiments on the subject was the t the Old Bailey of two men employed by the Bell's Asbestos Cor on the charge of obtaining money by false pretences. The d was that the money had been placed at their disposal for the purp tipping, and had been so expended; and the jury, apparently ad this view, brought in a verdict of "Not guilty."

The evidence in this case has amply confirmed information w long had in our possession as to the wholesale system of ti pursued by some firms. In many instances the travellers are cons instructed to secure this or that man in particular works "and him well." From the manager to the engineer, from the high the lowest, everyone who can in any way influence an order receive a "tip" in amount and form most likely to be acceptable recipient. The heads of this particular firm do not attempt to di the fact that their business is conducted on this principle; indee admit that they "palmed" right and left. Here is a specimen letters sent from the firm to their representatives, taken fro evidence produced in court in the Bell case:—

"When the grouse season comes on we are thinking of sen brace of birds to all those men who are in a position to influence between now and Christmas. This seasonable gift would, of c only be sent to men of the better class; and we think it would amiss to include an employer here and there in our list of reci The grouse would be sent out about the latter end of August; we propose sending you the labels, to be addressed by yourself t of the men in your district as would be likely to show their appre of the compliment in the manner desired. Please let us know many labels you will want; the managers of sewage, gas, water and such concerns, also as surveyors of local boards."

The excuse is made that without these tips goods do not g play. But what chance of fair play would a firm have who d adopt the same tactics? Although pursued so recklessly this ping" is not done aboveboard. The man who receives these siderations does not look upon them as a clerk might do who present from his employer, but regards them as bribes, and is c to maintain secrecy with respect to their receipt. In the case of bodies it is now illegal to give or receive bribes; in general tr may still be done so far as the law is concerned; but ev Recorder will not contend that there is any moral, although ther be a legal distinction. It is beyond all question that the ex system of tipping which is now carried on leads to wholesale de lisation and corruption, and is undermining all honest trade.—*Mall Gazette*.

EDINBURGH WATER SUPPLY.—The Works Committee of burgh Water Trust have issued a report giving the results of an i instituted in the summer of last year upon the question of add water supply to the city. They visited the Falla, Manor, a Mary's Loch waters in Peeblesshire. The report states that th sumption of water by Edinburgh and district has since 1879 inc from 7,000,000 gallons per day to 15,000,000 gallons, leaving a margin of 1,000,000 gallons to meet the increasing demand. T of this scheme, as estimated by the engineers, would be £664,0 £42,266. per million gallons per day. The Committee express ment with the engineers' opinions, and as seven or eight year elapse before the new supply is available, it would not, in their be prudent for the trustees to delay much longer. The cost Falla scheme would be £97,000. for 24 million gallons a day. first instalment as regards St. Mary's Loch would be £681,0 the total £1,065,000. For the Manor scheme it is estimated th progressive surplus is sufficient to meet the increased expendi 1896-7, when an additional 1d. per £1. on the rate would be made. The Tweed scheme would create a larger defi 1896-7, and would require the raising of the rate for 1897-8 by per £1. Under the St. Mary's Loch scheme the first de would occur in 1894-5, which could be met by an increase of £1., rising in 1895-6 to 2d. per £1., and in 1896-7 and 1897-8 to per £1.

Correspondence.

ANSWERS TO CORRESPONDENTS.

P.H.—True; but the increased demand for electrical purposes is absorbing enormous quantities.

J.A.W.—See our article on the Porion Evaporation in this Journal of November 17th, 1888. It contains all the information you require.

J.—You seem sceptical, but we shall convince you.

W.W.—Yes. Water such as you describe can be easily dealt with.

G.V.—From your description it appears to us that your friends have been sending you Bone Ash, instead of Bone Dust.

C.R.—By all means. Come and see it at any time.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

BEESWAX.

To the Editor of the Chemical Trade Journal.

SIR,—Some time ago I had to test a sample of beeswax for a large calico printing firm, which gave bad results when made into paint, along with other materials for protecting the parts intended to be white, in the engraving of copper rollers. The sample contained only:—

8.2% Cerotic acid,
53.7% Cericin,

and 35% of hydrocarbon wax was isolated from it.

As this may possibly occur at other places, I thought it would interest the readers of the *Chemical Trade Journal*.—Faithfully yours,

Crossfield Terrace,

J. ARTHUR WILSON.

Tottington, near Bury.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

A COMPANY has been organised to utilise the power of Niagara River above the falls, not of the falls, by means of a main tunnel about two miles and a half long with certain cross tunnels, and the *New York Evening Post* says that money is already subscribed, and that one of the best-known banking houses in Wall-street is deeply interested in this undertaking. Work, it is said, will begin within a month.

THE RAILWAY RATES INQUIRY.

CHEMICAL MANURES.

IN evidence given at a recent sitting by Mr. George Baylis in relation to the rates proposed for chemical manures, he said: I am the representative of the Berks and Oxon Chamber of Commerce, and also of 170 of the leading agriculturists and traders attending Newbury and Reading markets. Respecting the classification of manures in the original Acts of the North-Eastern, Midland, South-Western, Brighton, South-Eastern, London, Chatham, and Dover, and other railway companies, all kinds of manures were placed in the lowest class. They are now seeking to put artificial manures and chemical manures in the same class as grain. The manure rate on the London and North-Western Railway Company, under their old Parliamentary powers, for fifty miles is 5s. 2d. Their grain rate is 10s. 5d. In justification the railway companies say, first, that artificial manures were almost unknown at the time they obtained their Parliamentary powers; secondly, that these artificial manures are very valuable; thirdly, that they are in bags; and, fourthly, that in drafting their revised classification they followed the Clearing House classification, and as the rates that are in force by the Clearing House classification have not been objected to hitherto, they have a right to use them now. With regard to the first point, I may say that the period when those railway companies obtained their powers was from 1844 to 1854, and during those eleven years there was an importation of 1,570,000 tons of artificial manures and guano. That was sufficient to manure at the rate of 2 cwt. to the acre, 2,000,000 acres every year. Is it possible that Parliament could not have known that this manure was being used? The guano of those days was very different to the guano of these days. It contained 19½ per cent. of ammonia. There are about twenty artificial manures classified. Only one of these touches the figure of £10. a ton, which was quoted by Mr. Findlay. Some are as low as 30s. per ton. Artificial manures are almost undamageable. I have paid for railway charges, directly and indirectly, on a thousand tons since I have been in business, and I have never had occasion to make a claim on the railway company for damage. The fact of artificial manure being packed is an advantage to the railway company, because the trucks are kept cleaner and can be loaded and unloaded with greater facility. As a practical agriculturist, I say there is no limit to the fertility of the soil with a proper application of manure; the only difference between our soil and that of America is that the latter possesses the ammonia, phosphates, and alkalis abundantly, whereas we have none at all; and, therefore, it is a matter of life and death to the farmer to be able to procure such commodities cheaply.

Cross-examined by Sir H. James, Q.C.: A ton of farmyard manure is worth to the sower about 6d. a ton, but a ton of sulphate of ammonia is worth to-day about £11. 5s. or £11. 10s. per ton. I think all manures ought to be carried at the same rate.

Sir H. James: Although if farmyard manure were injured in transit the railway company would only have to pay a few shillings, whereas if the sulphate of ammonia were injured they would have to pay £12?

Mr. Baylis: I never heard of ammonia being injured in transit. I have never had it injured by wet, nor have I known of its being so injured in railway-trucks.

Sir H. James: Would chemical manure suffer from being wet?

Mr. Baylis: I scarcely think it would suffer sufficiently for anyone to claim damage. The wet would run off. It would never get wet through. It is bagged in proper bags.

At the sitting of the inquiry on Wednesday, February 26th, in the course of his examination as to artificial manures, Sir John Lawes stated that high rates on these for carriage were a burden upon agriculturists, whose produce now fetched a comparatively low price.

Mr. Foster, of the Anglo-Continental Guano Works, said there were about 1,000,000 tons of manure used in the country during the year, mainly distributed in small parcels. The importation of guano, which reached at one time 1,000,000 tons per annum, has now fallen off, and the artificial manures had risen. On the railways terminal services were discharged by consignors and consignees, and he considered it unfair that a charge should be made by the companies for terminal services which were not rendered by them.

The witness admitted, in cross-examination, that some manures needed sheeting, and that that was a service.

Mr. Edward Packard, of Bramford, also gave evidence as to the displacement of guano by artificial manures, and that fair rates for these were of immense importance to agriculturists. He considered the proposal to put the large and small station expenses together and charge them upon the traders as unfair. He would not object to have his manure charged as farmyard manure.

Mr. Vickers, manure manufacturer, of Manchester, Widnes, and Sandbach, complained that the rates already charged by the London and North-Western Railway were above their statutory powers, and objected to the proposed rates, as they would nearly double the present charges.

PAINT PRESERVATIVES FOR IRON.

TOO much stress cannot be laid upon the condition of the surface of the iron at the time of coating; and it is perfectly essential either to have a dry surface or else a composition which is not affected by water. Prof. Lewis remarks that when an old iron structure is broken up, on the backs of the plates may often be seen the numbers painted on them in white lead and linseed oil when the work was put together, and under the paint the iron is in a perfect state of preservation, the secret being that the paint was put on while the plates were hot and dry.

Compounds prepared with boiled linseed oil are open to objection, on account of the presence of lead. The drying of boiled linseed oil is due to the fact of its containing a certain quantity of an organic compound of lead; and the drying property is, moreover, imparted by boiling it with litharge (oxide of lead), so that lead compounds are present even when the oil is not mixed with red or white lead pigment. When boiled oil dries, it does so by absorbing oxygen from the air, and becomes converted into a kind of resin, the acid properties of which also have a bad effect upon iron. Protectives of the class of tar and its derivatives, such as pitch and black varnish, and also asphalt and mineral waxes, are regarded by Professor Lewes as among the best. Certain precautions, however, must be taken in the case of tar and tar products, both of which are liable to contain small quantities of acid and ammonia salts. If care is taken to eliminate these, and if it could be contrived to always apply this class of protectives hot to warm iron, the question of protection would be practically solved; bituminous and asphaltic substances forming an enamel on the surface of iron which is free from the objections to be raised against all other protectives—that is, of being microscopically porous and therefore pervious to water. Spirit or naphtha varnishes are condemned by Professor Lewes as open to several objections. Varnishes to which a body has been given by some pigment, generally a metallic oxide, are preferable to the last class, "if the solvent used is not too rapid in its evaporation, and if care has been taken to select substances which do not themselves act injuriously upon iron, or upon the gums or resins which are to bind them together, and are also free from any impurities which could do it."

At the present time, as the author truly remarks, the favourite substance for this purpose is the red oxide of iron; but care should be taken to exclude from it free sulphuric acid and soluble sulphates, which are common impurities and extremely injurious. The finest coloured oxides are, as a rule, the worst offenders in this respect, as they are made by heating green vitriol (sulphate of iron), and in most cases the whole of the sulphuric acid is not driven off, the heat required being injurious to the colour. The acid is often neutralised by washing the oxide with dilute soda solution; but very little trouble, as a rule, is taken to wash it free from the resulting sulphate of soda, which is left in the oxide. The best form of oxide of iron to use for paint making is obtained by calcining a good specimen of hematite iron ore at a high temperature. When prepared in this way it contains no sulphates, but a proportion of clay which is harmless if it does not exceed 12 to 18%. Paint makers can easily test their red oxide for soluble sulphates by warming a little of it with pure water, filtering, and adding to the clear solution a few drops of pure hydrochloric acid and a little chloride of barium solution. If a white sediment forms in the solution, the sample should be at once rejected.

In the application of a preservative coating to iron, Prof. Lewes directs, first, thorough scraping and scrubbing from all non-adherent old paint and rust. New iron should be pickled with dilute acid to get rid of every trace of mill scale; the acid to be neutralised afterward by a slightly alkaline wash, and this again to be washed off by clean water. Under these conditions, and given a composition of good adhering properties, but little apprehension need be felt with regard to the ravages of corrosion, the chief remaining risks being from abrasion or other mechanical injury to the composition, coupled with improper constituents in itself.—*Scientific American*.

A GREAT STEEL PLANT.—The *Iron Age* prints the following report of the business of the Illinois Steel Company in 1889:—

Capital issued	17,622,600dols.
Number of employes	9,247
Total wages paid	4,577,000dols.
Value of product	19,000,000
Pig metal produced, tons	572,095
Rails, tons	461,147
Wire, tons	43,488
Merchant bar and nails, tons	60,230
Billets, tons	50,289
Spiegel and ferro-manganese, tons	18,031
Beams and slabs, tons	4,030

The works consumed 775,000 tons of ore, 575,000 tons of coke 140,000 tons of coal, and 200,000 tons of limestone.

Trade Notes.

THE IMPORTATION OF FOREIGN CATTLE INTO DUNDEE.—meeting of a sub-committee of the Dundee Harbour Board, the bourn engineer submitted a plan prepared by him for providing accommodation for the landing, storage, and sale of foreign cattle at Dr Harbour. After consideration, it was agreed to recommend the board approve of the scheme, and instruct Mr. Cunningham (engineer) to take in offers for building sheds and other necessary tions, and also that he proceed with the construction of the wharf other requisite works. The committee expect that the sheds will commodate about 600 head of cattle, and that there will be room any future extension as circumstances may require.

THE ODESSA PETROLEUM MARKET.—Although the demar small, prices are steady—1 rouble 12 copecks, 1 rouble, 13 copeck pood in tank; and 1 rouble 32 copecks, 1 rouble 33 copecks in ti barrels. The tank steamer Lux, which was in the dock at Tr left that place for Batoum for kerosine. The present winter was unfavourable for the petroleum trade. Usually with the adve autumn the price of kerosine advances in comparison with the sur prices, which advancement continues up to December and Januar all wholesale merchants make their purchases at that time; wher days lengthen the prices gradually go down. This winter, how the opposite occurred—the price was pretty high during the sun on account of the temporary difficulty of getting and taking ker to Batoum; with the advent of autumn it began to go down during the winter kerosine was cheaper than during the sum Therefore, the wholesale merchants did not hurry to make l purchases.

NITRATE OF SODA.—Messrs. Laird and Adamson's Liverpool: ular shows that there have been shipped from the West Co America to Europe this year 48,000 tons of nitrate, and that there loading on the 1st inst. a further 48,000. There were afloat a beginning of this month 329,000 tons (including cargoes between of call and destination, but deducting 8,000 tons lost at sea), ag 340,000 tons same date last year. The table of comparative p during past years is very interesting, as showing the extent o reduction in the cost of the article. Ten years ago on the 1st M the price was 18s. 9d to 19s., whereas now it stands about 8s. 1, as against 11s on March 1st, 1889. It appears that there are : 8,000 tons in stock in Liverpool at present.

A NEW GERMAN GLASS.—A new red glass has been recentl vented in Germany, and appears to be attracting a good deal of a tion. Besides its use for the manufacture of bottles, goblets and of various kinds, it will be found applicable in photography an chemists' and opticians' laboratories. This glass is produced by r ing in an open crucible the following ingredients: Fine sand, 2 parts; red oxide of lead (minium), 400; carbonate of potash, lime, 100; phosphate of lime, 20; cream of tartar, 20; borax, red oxide of copper (protoxide), 9; and bixide of tin, 13 parts. single melting a transparent red glass is thus obtained of a very quality, of which various objects can be manufactured directly, wi it being necessary to submit the glass to a second heating with the of intensifying the colour.

Market Reports.

REPORT ON MANURE MATERIAL.

The better feeling in the market, which we referred to in our week's report, continues, and a fair amount of business has been at somewhat better prices for phosphates, but without material ch for nitrogenous material.

We hear of further business in Charleston River phosphate rock 11d. per unit, which is now the current price, cost, freight, insurance to U.K. For land rock ½d. per unit less would prob be accepted. We have no alteration to report in values of Somme Belgian phosphates. The Florida phosphate rock is now defin offering in quantity, but shippers do not seem much inclined to ac prices which U. K. buyers are prepared to give. There is, how a disposition to try this new description of rock, and we don't t that any difference of idea as to price will stand very long in the of business. The Canadian shippers are now offering their rock at prices which so far preclude any extensive business.

A small cargo of River Plate bones, December shipment, has sold for U.K. on private terms, but understood to be at £5. 8s Less would be accepted for a large mixed cargo December shipn but pending arrival buyers seem shy of touching it. Further sal crushed Kurachee bones for March shipment have been mad

PRICES CURRENT.

WEDNESDAY, MARCH 5, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

		£	s.	d.
ic, 25 % and 40 %	per cwt	7/6	12/6	
Glacial	"	2	10	0
mic, S.G., 2000°	"	0	12	9
omic 82 %	nett per lb.	0	0	6½
oric	"	0	0	3¾
atic (Tower Salts), 30° Tw.	per bottle	0	0	8
(Cylinder), 30° Tw.	"	0	2	11
ic 80° Tw.	per lb.	0	0	2
ous	"	0	0	1¾
lic	nett	0	0	3¾
ic	"	0	1	4
phuric (fuming 50 %)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (150°)	"	1	8	0
" (free from arsenic, 140/145°)	"	1	10	0
phurous (solution)	"	2	15	0
nic (pure)	per lb.	0	1	0½
taric	"	0	1	2½
ic, white powdered	per ton	13	15	0
(loose lump)	"	4	15	0
ina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
inium	per lb.	0	15	0
onia, 880=28°	per lb.	0	0	3
" =24°	"	0	0	1¾
Carbonate	nett	0	0	3½
Muriate	per ton	23	10	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-	
Nitrate	per ton	40	0	0
Phosphate	per lb.	0	0	10½
Sulphate (grey), London	per ton	11	17	6
" (grey), Hull	"	11	17	6
ne Oil (pure)	per lb.	0	0	11
ne Salt	"	0	0	9½
ony	per ton	75	0	0
" (tartar emetic)	per lb.	0	1	1
" (golden sulphide)	"	0	0	10
m Chloride	per ton	7	10	0
Carbonate (native)	"	3	15	0
Sulphate (native levigated)	"	45/-	to 75/-	
hing Powder, 35 %	"	5	2	6
" Liquor, 7 %	"	2	10	0
phide of Carbon	"	12	15	0
mium Acetate (crystal	per lb.	0	0	6
um Chloride	per ton	2	0	0
Clay (at Runcorn) in bulk	"	17/6	to 35/-	
Tar Dyes:—				
arine (artificial) 20 %	per lb.	0	0	9
genta	"	0	0	9
Tar Products				
thracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	6
azol, 90 % nominal	per gallon	0	3	10
" 50/90	"	0	3	0
bolic Acid (crystallised 35°)	per lb.	0	0	10
" (crude 60°)	per gallon	0	2	10
osote (ordinary)	"	0	0	2½
" (filtered for Lucigen light)	"	0	0	3
ide Naphtha 30 % @ 120° C.	"	0	1	5
ase Oils, 22° Tw.	per ton	3	0	0
ch, f.o.b. Liverpool or Garston	"	1	12	0
vent Naphtha, 90 % at 160°	per gallon	0	1	11
oven Oils (crude)	"	0	0	2½
r (Chili Bars)	per ton	46	15	0
Sulphate	"	25	10	0
Oxide (copper scales)	"	52	0	0
rine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	55	0	0
"	nett, per oz.	8½	d. to 9d.	
sulphate (copperas)	per ton	1	10	0
sulphide (antimony slag)	"	2	0	0
(sheet) for cash	"	14	0	0
Litharge Flake (ex ship)	"	17	0	0
Acetate (white	"	23	5	0
" (brown	"	18	15	0
Carbonate (white lead) pure	"	19	0	0
Nitrate	"	22	5	0

		£	s.	d.
Lime, Acetate (brown)	"	8	5	0
" (grey)	per ton	14	0	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	6	3
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	18	0	0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6	
" Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	11
" Miscible, 60° O.P.	"	0	4	9
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	23	10	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5½
" American	"	0	0	5½
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	17	15	0
" Chlorate	per lb.	0	0	4¾
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
" (Caustic Potash) 75/80 %	"	21	10	0
" (Caustic Potash) 70/75 %	"	20	15	0
" Nitrate (refined)	per cwt.	1	3	6
" Permanganate	"	4	5	0
" Prussiate Yellow	per lb.	0	0	9¾
" Sulphate, 90 %	per ton	9	10	0
" Muriate, 80 %	"	7	15	0
Silver (metal)	per oz.	0	3	8½
" Nitrate	"	0	2	5½
Sodium (metal)	per lb.	0	4	0
" Carb. (refined Soda-ash) 48 %	per ton	5	15	0
" (Caustic Soda-ash) 48 %	"	4	15	0
" (Carb. Soda-ash) 48 %	"	4	17	6
" (Carb. Soda-ash) 58 %	"	5	15	0
" (Soda Crystals)	"	2	15	0
" Acetate (ex-ship)	"	15	15	0
" Arseniate, 45 %	"	10	0	0
" Chlorate	per lb.	0	0	6¾
" Borate (Borax)	nett, per ton	30	0	0
" Bichromate	per lb.	0	0	3
" Hydrate (77 % Caustic Soda)	per ton	10	15	0
" (74 % Caustic Soda)	"	10	7	6
" (70 % Caustic Soda)	"	9	2	6
" (60 % Caustic Soda, white)	"	8	2	6
" (60 % Caustic Soda, cream)	"	7	15	0
" Bicarbonate	"	5	15	0
" Hyposulphite	"	5	5	0
" Manganate, 25 %	"	8	10	0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	4½
" Nitrite, 98 %	per ton	27	10	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7¾
" Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40 %	per cwt.	2	0	0
" Sulphate (Salt-cake)	per ton	1	12	6
" (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98 %	"	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	8
" Barium, 95 %	"	0	0	5¾
" Potassium	"	0	0	8
Sulphur (Flowers)	per ton	6	15	0
" (Roll Brimstone)	"	6	0	0
" Brimstone: Best Quality	"	4	7	6
Superphosphate of Lime (26 %)	"	2	10	0
Tallow	"	25	10	0
Tin (English Ingots)	"	95	0	0
" Crystals	per lb.	0	0	6¾
Zinc (Spelter)	per ton	22	5	0
" Chloride (solution, 96° Tw.	"	6	0	0

THE CHEMICAL TRADE JOURNAL

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No. 147.

SATURDAY, MARCH 15, 1890.

Vol. 1

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Notices.

All communications for the *Chemical Trade Journal* should be addressed, and Cheques and Post Office Orders made payable to—**DAVIS BROS., 32, Blackfriars Street, MANCHESTER.**

Our Registered Telegraphic Address is—**"Expert, Manchester."**

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Readers will oblige by making their remittances for subscriptions by Postal or Post Office Order, crossed.

Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates :—

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Each additional 10 words 6d. "

Advertisements of Situations Wanted are inserted at one-half the above rates when prepaid, viz :—

30 Words and under..... 1s. 6d. per insertion.

Each additional 10 words 3d. "

Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid, are charged at the Tariff rates, which will be forwarded on application.

TECHNICAL INSTRUCTION.

IF ever there was sufficient proof that the Technical Instruction Act is not a popular measure, and the general public (aye, and even those whom it is supposed to benefit) do not care a jot for it, that proof may be found in the meeting that took place on Tuesday in last week at Owens College, Manchester. It was previously announced that Mr. W. Mather, M.P., would address the meeting on the question, but even the magic of Mr. Mather's name was not sufficient to draw an audience. The Technical Education propagandists may well now inquire why the public, interested public—having been piped to, have not listened. Why have they not listened to the voice of the charmer who has charmed never so wisely?

The meeting at Owens College was a dismal failure, we say it was not even representative we shall be correct. The press was well represented, four representatives being present, but when the meeting commenced the audience consisted of twelve souls, all told, and by the time the meeting was concluded the number had reached twenty-five. In spite of this want of interest, as evidenced by the poor attendance, a resolution was put and carried, as if the world had been concerned in it, and a memorial presented upon the instructions of that resolution for submission to the Manchester City Council.

We have for a long time urged against the extension of these tactics for the purpose of raising the wind by technical education. To a few it is perfectly well known that there are certain institutions, like many individuals, sadly in need of cash, but they have not the courage to come before the public and say so in true English fashion. The money wanted, and if it can be raised compulsorily from the payers without letting them know definitely what is done with it so much the better for the memorialists. We have never yet seen any scheme formulated tending to a technical education as it is, but we have seen schemes that the money so raised would be judiciously spent on technical education. The Technical Education zealots have any device in particular except that of supplying some part of technical instruction with the needful. In these mercenary days we are taught to believe in the doctrine of the survival of the fittest; we are taught to believe in ordinary daily life, in which nothing is not supported by the mass of the population in which it is not required—that it must give way to others that are necessary—that it is a sin to foster it by subsidies and artificial means.

The apathy shown by the general public to the Technical Education problem, as it at present exists before us, shows that it belongs to the class which should be left alone to make room for some better matured scheme, and it is only now kept alive by means of such artificial subsidies as have prompted these present remarks. We have by no means without experience in the needs and requirements of technical instruction in this country, and it is the greatest humiliation that we regard this measure, we remember that some of our most competent minds have been employed in its production.

eters. S. Z. de Ferranti. 3,096. February 26.
 eters. S. Z. de Ferranti. 3,097. February 26.
 Matters. H. H. Lake. 3,098. February 26.
 on Burners.—(Complete Specification). J. W. B. Wright. 3,100.
 y 26.
 es. W. Keyworth. 3,116. February 27.
 re of Aerated Waters. J. P. Jackson. 3,117. February 27.
 re of Glass Bottles. D. Rylands. 3,121. February 27.
 ents in Gas Lamps. T. C. J. Thomas. 3,130. February 27.
 amps. F. R. Boardman. 3,133. February 27.
 . J. S. McDougall and J. T. McDougall. 3,134. February 27.
 re of Glass Bottles. W. Ambler. 3,138. February 27.
 il Gas Furnace or Forge. The Lucigen Light Co., Ltd. and T.
 hain.
 istating Compound. W. Grove and L. Lewis. 3,151. Feb. 27.
 re of Electrical Conductors. W. A. Thoms. 3,152. Feb. 27.
 re of Electrical Conductors. W. A. Thoms. 3,153. Feb. 27.
 re of Alloys. W. A. Thoms. 3,154. February 27.
 hic Camera Slides. F. A. Gregory and H. F. Ainley. 3,155.
 y 27.
 re of Water Gas. B. von Steenberg. 3,160. February 27.
 witches. P. P. Alexander. 3,163. February 27.
 ating Apparatus.—(Complete Specification). C. E. Carpenter.
 February 27.
 l Stokers. J. Proctor. 3,186. February 28.
 Apparatus. J. Swinburne. 3,193. February 28.
 Conductors. F. Cook. 3,205. February 28.
 of Sand from Water. G. F. W. Hope. 3,209. February 28.
 of Metallic Sodium and Chlorine Gas. J. Greenwood. 3,220.
 y 28.

The Automatic Regulation of Electromotive Force. J. Shipp. 3,231.
 February 28.
 Hot Air Gas Lamps. F. Siemens. 3,236. February 28.
 Manufacture of Artificial Tartaric Acids. A. A. Brebier and B. G. Talbot
 3,240. February 28.
 Use of Liquid Hydro-carbons for Heating and Lighting. H. H. Doty.
 3,242. February 28.
 Extraction of Gold and Silver. W. D. Bohm. 3,245. February 28.
 3,246. February 28.
 Water Filtering Apparatus.—(Complete Specification). H. H. Lake. 3,261.
 March 1.
 Dynamos. C. N. Russell and R. A. Scott. 3,271. March 1.
 Electric Switches. G. E. Fletcher. 3,272. March 1.
 The Reduction of Metallic Ores. G. Simonin. 3,275. March 1.
 Telephonic Apparatus. A. Whalley. 3,276. March 1.
 Gas Governors. E. Patterson. 3,277. March 1.
 Water Heaters. W. H. Skinner. 3,279. March 1.
 Brick Making Machinery. W. Sayer. 3,285. March 1.
 Manufacture of Glass. J. G. Sowerby. 3,286. March 1.
 Tubular Apparatus for Heating Feed Water. A. Schneider. 3,292.
 March 1.
 Manufacture of Tanning Liquors. P. Houston and C. Beakbane. 3,295.
 March 1.
 Apparatus for Drying Steam. J. S. McDougall, J. T. McDougall, and T. D.
 Sugden. 3,302. March 1.
 Dyestuffs. B. Willcox. 3,303. March 1.
 Electrical Apparatus. M. C. Greenhill. 3,304. March 1.
 A Continuous Coking Furnace.—(Complete Specification). H. Ekelund.
 3,306. March 1.
 Treatment of Sewage. W. E. Adeney and W. K. Parry. 3,312. March 1.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

ek ending Mar. 4th.

y Ore—

9 t. J. W. Cater, Sons, &
 Co.
 5 H. Bath & Son
 8½ B. Kuhn
 old—
 53 pkgs. Little & Johnston

19 t. 2 c. Dyster, Nalder,
 & Co.
 alia, 1½ Flack, Chandler, &
 Co.
 1 12 C. Hicks, Nash, & Co.
 17 Anning & Cobb
 16 W. C. Bacon & Co.

21 cks. W. A. Rose & Co.
 21 W. Harrison & Co.
 20 A. Zumbach & Co.
 500
 23 O'Hara & Hoar
 22 " A Boltz
 46

800 A. & M. Zimmer-
 mann

duc—

1½ c. W. M. Smith & Sons
 41 Kebab, Son, & Co.
 1½
 30 Union Lighterage Co
 3 J. F. O'Bree & Co.
 63 G. Ward & Sons
 14 Cadwell, Watson, & Co.
 17 L. & I. D. Jt. Co.
 75 Chalmers, Guthrie & Co.
 17 Craven & Co.
 27½ Kebab, Son, & Co.
 car, 4 c.

artar—

10 pkgs. T. Ronaldson & Co
 4 cks. B. & F. Wf. Co.
 3 pkgs. C. F. Gerhardt
 18 W. C. Bacon & Co.
 is (otherwise undescribed)
 340 A. & M. Zimmermann
 17 T. H. Lee
 76
 5 B. Burton & Sons
 400 A. & M. Zimmermann
 24 Philipps & Graves
 13 Kaul & Haenlein
 21 Beresford & Co.
 5 Philipps & Graves
 62 T. H. Lee
 9 Evans, Lescher, & Co.

Caustic Potash—

Holland, 7 pkgs. Spies Bros., & Co.
 Germany, 1 Domeier & Co.

Dyestuffs—

Gambler
 E. Indies, 2 pkgs L. & I. D. Jt. Co.
 " 123 Beresford & Co.
 " 842 L. & I. D. Jt. Co.
 " 429 Brinkmann & Co.
 " 250 H. Lambert
 " 167 Elkan & Co.
 " 168 P. S. Evans & Co.

Extracts

France, 1 pkg. G. Vogt & Co.
 Holland, 68 J. Forsey
 U. S., 70 Levinstein & Sons
 U. S., 220 T. Ronaldson & Co.
 France, 148 Prop. Chamblin's Wf.
 " 291 Levinstein & Sons
 Canada, 160 A. J. Humphery
 U. S., 40 W. A. Bowditch
 " 25 W. Burton & Sons
 Norway, 1 Johnson & Jorjenson

Annatto

France 4 pkgs. Fullwood & Bland
 N. Zealand, 39 t. L. & I. D. Jt. Co.
 S. Australia, 39 T. J. & T. Powell
 France, 5 c. W. Jacques
 Belgium, 3 T. H. Lee
 N. Zealand, 10 19 W. H. Boulton

Indigo

E. Indies, 115 cts. L. & I. D. Jt. Co.
 " 10 Philipps & Graves
 " 58 T. H. Allan & Co.
 " 8 Stahlschmidt & Co.
 W. Indies, 3 Patry & Pasteur
 E. Indies, 71 L. & I. D. Jt. Co.
 " 39 P. & O. Co.
 " 267 Patry & Pasteur
 " 5 Philipps & Graves
 " 12 Williams, Torrey, & Co.
 " 10 H. Lambert
 " 19 L. & I. D. Jt. Co.
 " 36 Elkan & Co.
 " 1 G. Dards
 " 18 F. Stahlschmidt & Co.
 " 16 H. Johnson & Sons
 " 10 Gordon, Woodroffe, & Co.
 " 20 T. Ronaldson & Co.
 " 5 J. Owen
 " 10 A. Hagan
 " 18 W. Brandt, Sons, & Co.
 " 48 L. & I. D. Jt. Co.
 " 19 W. France & Co.
 " 53 4 bxs. J. B. Westray
 " 24 Langstaffe & Co.
 S W. Indies, 20 pkgs. J. A. Haddew & Co.

E. Indies, 1 box. Elkan & Co.
 " 25 cts. T. Ronaldson & Co.
 " 284 Arbuthnot, Latham, & Co.
 " 34 Benecke, Souchay, & Co.
 " 19 cs. Widemann, Broicher, & Co.
 " 14 F. W. Heilgers & Co.
 " 6 Stansbury & Co.
 " 2 bxs. 17 Ross & Deering
 " 3 cs. 125 L. & I. D. Jt. Co.
 " 3 tubs. "

Myrabolams

E. Indies, 2,250 pkgs. G. S. N. Co.
 " 683 Hoare, Wilson, & Co.
 " 248 Beresford & Co.
 " 1,340
 " 2,000 J. Graves

Valonia

A. Turkey, 96 t. A. & W. Nesbitt
 " 57 J. Graves
 " 7 Zarifi Bros. & Co.

Orchella

Ceylon, 7 pkgs. Walker, Munsie, & Co.

Turmeric

E. Indies, 174 bgs. L. & I. D. Jt. Co.
 Dyestuffs (otherwise undescribed)
 28 pkgs. T. Clarke

Glycerine—

Holland, 2,345 Prop. Scott's Wf.
 Germany, 68 Beresford & Co.
 France, 20 R. Baelz & Co.
 S. Australia, 175 H. Hill & Sons

Glucose—

Denmark, 10 pkgs. 20 c. M. D. Co.
 Germany, 850 850 J. Barber & Co.
 " 30 240 T. M. Duche & Sons
 " 45 354 L. Sutro & Co.
 " 23 180 J. Knill & Co.
 " 30 240 Pillow, Jones, & Co.
 " 50 403
 " 25 120 M. D. Co.
 " 5 43
 " 10 80 C. S. Lovell
 " 100 120 Burgoyne, & Co.
 Germany, 200 pkgs. 200 cwt. J. Barber & Co.
 " 55 410 J. H. Epstein
 " 60 43 M. D. Co.
 " 200 200 J. F. Ohlmann
 " 200 200 Howell & Co.
 " 4 22 Knill & Co.
 " 17 160 R. G. Hall & Co.

" 5 pkgs. 50 c. J. Forsey
 " 37 294 L. Sutro & Co.
 " 30 240 Pillow, Jones, & Co.
 U. S., 200 200 J. Barber & Co.
 " 600 600 A. Dawson

Gutta Percha—

E. Indies, 52 c. Cundall & Co.
 " 172 Kaltenbach & Schmitz
 " 135
 " 172 Kleinwort, Sons, & Co.

Isinglass—

E. Indies, 6 pkgs. L. & I. D. Jt. Co.
 B. W. I., 1 Hale & Sons

Manure—

Phosphate Rock
 France, 140 t. Lawes' Manure Co.
 Belgium, 170
 France, 182
 " 285 A. Hunter & Co.
 Aruba, 432 G. M. Barier
 Belgium, 30 Leach & Co.
 " 30 D. de Pass & Co.

Manure (otherwise undescribed)

Germany, 51 t. Perkins & Homer
 " 10 Cornwall, Son, & Co.

Naphtha—

Germany, 8 brls. Lister & Biggs
 Holland, 95
 " 95

Paraffin Wax—

U. S., 1,000 brls. J. H. Usmar & Co.
 " 200 E. & H. Holdsworth
 " 20 Anglo American Oil Co.
 " 245 G. H. Frank
 " 145 H. Hill & Son

Petroleum—

Belgium, 4 brls. J. L. Lyons & Co.
 " 10 Sawyer, Mead, & Co.
 U. S., 150 Rose, Wilson, & Rose
 " 560 C. T. Bowring & Co.
 " 50 Barrett, Tagant, & Co.
 " 30 Grindley & Co.
 " 7,370 Anglo American Oil Co.
 " 51 A. Browne & Co.
 " 40 M. W. D. Co.
 " 75
 " 1,343 Anglo American Oil Co.
 Belgium, 10 Sawyer, Mead, & Co.
 " 9

Pitch—

France, 62 brls. H. Hill & Sons

Plumbago—

Germany, 19 cks. W. W. Lupton
 Ceylon, 74 R. G. Hall & Co.
 Germany, 81 Prop. Scott's Wf.
 Holland, 26 Brown & Elmslie
 Ceylon, 60 L. & I. D. Jt. Co.

Permanganate—
France, 44. Spies, Bros., & Co.
Potash—
France, 9 pkgs. Carey & Sons
Potassium Carbonate—
France, 3 pkgs. Charles & Fox
" 8 43. T. A. Reid
Holland, 22. E. W. Carling & Co.
Spies, Bros., & Co.
Potassium Murate—
Holland, 26 pkgs. H. Johnson & Sons
Germany, 100. F. W. Berk & Co.
Potassium Hydrate—
Holland, 5 pkgs. Spies, Bros. & Co.
Potassium Prussiate—
Germany, 20 pkgs. A. & M. Zimmermann
Potassium Sulphate—
France, 43. Weatherley & Co.
Germany, 90 pkgs. H. Lambert
Pearl Ash—
France, 35 c. Petri Bros.
" 112. M. Perls & Co.
Saltpetre—
Germany, 36 brls. P. Hecker & Co.
" 30 cks. Craven & Co.
" 76. J. Hall & Son
" 118. P. Hecker & Co.
E. Indies, 464 bgs. C. Wimbly & Co.
Belgium, 500. Anglo Contl. Guano Works
Stearine—
Holland, 54 brls. J. H. Usmar & Co.
France, 20 sks. J. Goldard & Co.
Sodium Nitrate—
Germany, 420. H. Lambert
" 33. Spies, Bros., & Co.
Tartaric Acid—
France, 7 pkgs. B. & F. Wf. Co.
Holland, 4. Augspurg, Hopf, & Co.
Holland, 31. B. & F. Wf. Co.
Ultramarine—
Belgium, 8 cs. Leach & Co.
Germany, 4 pkgs. H. Lambert
Belgium, 11. Leach & Co.
Holland, 5 cks. Ohlenschlager Bros.
Belgium, 5. Leach & Co.
" 15 pkgs. W. Harrison & Co.
Verdigris—
France, 415. C. Brunlen
Zinc Oxide—
Holland, 30 cks. Hernu, Peron, & Co.
" 100. W. Balchin

LIVERPOOL

Week ending Mar. 6th.

Antimony Ore—
Mantel, 950 bgs.
Alumen—
Antwerp, 7 cs. J. T. Fletcher & Co.
Acetate of Lime—
St. Nazaire, 109 sks.
Bones—
Kurrachee, 3,000 bgs. Ralli Bros.
Boston, 4 tcs.
Bone Meal—
Kurrachee, 3,000 bgs. Ralli Bros.
Borate of Lime—
Valparaiso, 780 sks.
Caoutchouc—
Akassa, 136 bgs. Royal Niger Co., Limited
Sierra Leone, 30 cks. Broadhurst, Son & Co.
" 32. Cie Francaise
Bay Beach, 1 box. F. & A. Swanzy
Quittah, 3 brls.
Accra, 4 cs. J. H. Rayner & Co.
" 3 brls. 1 cs. Davies, Robbins & Co.
" 1 ck. 2 brls. C. Lane & Co.
Salt Pond—
" 2 brls. Hutton & Co.
" 4. Pickering & Berthoud
" 2. W. B. McIver & Co.
" 1. E. G. Gun
Cumersous—
" 16 cks. A. Herschell
" 9. J. Holt & Co.
" 10. R. & W. King
" 1. Rider, Son & Co.
" 1. Lucas Bros. & Co.
" 1. L. Hart & Co.
Old Calabar—
" 22. 3 cs. 9 brls. African Assen
" 16. Pickering & Berthoud
" 3. Morgan, Buchanan & Co.

Addah, 16 cks. Pickering & Berthoud
" 2 2 cs. Radcliffe & Durant
Accra, 2 1 bg. Perrin & Co.
" 7. Hutton & Co.
" 13. J. J. Fisher & Co.
" 1. Davies, Robbins & Co.
" 15. J. P. Werner
" 2. Edwards Bros.
Axim, 3 bgs. Pickering & Berthoud
" 1. Millerson & Co.
Grand Bassa, 1 ck. H. S. Attia
Salt Pond, 6 brls. A. Miller Bros.
" 14 bgs. G. C. Nordlinger
" 2 brls. Pitt, Bros. & Co.
" 1 cs. 2 brls. R. Barbour & Bros.
" 5. Fletcher & Fraser
" 2. F. & A. Swanzy
C. C. Castle, 1 brl. Edwards Bros.
" 3. Millerson & Co.
" 2. L. Hart & Co.
" 2. Havard & Co.
" 4. Holson & Co.
" 3. Davies, Robbins & Co.
" 2. Thiers & Bell
" 1. Pickering & Berthoud
" 1. F. J. Eaton & Son
" 2. Radcliffe & Durant
" 2. H. B. McIver & Co.
" 1 cs. 11 brls. Fletcher & Fraser
" 2 brls. A. Reis
" 7. C. Freese
" 2 cs. F. & A. Swanzy
" 2 brls. W. Duff & Co.
Sierra Leone, 14. Pickering & Berthoud
" 1 bg. Cie Francaise
" 50 pkgs.
Bathurst, 5 cks. A. Cros & Co.
" 7. Cie Francaise
Goree, 10 cks. A. Cros & Co.
" 4. S. Johnston & Co.
Cape Coast, 2 brls. Swanzy & Co.
Hppollonia, 14 bgs. Pickering & Berthoud
" 2. Edwards Bros.
" 4. Radcliffe & Durant
Assinee, 1.
Grand Bassam, 1 brl. 1 cs. Millward, Bradbury & Co.
" 2 bgs. Edwards Bros.
Sierra Leone, 1 brl. 14 pns. Paterson, Zachonis & Co.

Cream of Tartar—

Bordeaux, 2 cks.

Caustic Soda—

St. Nazaire, 19 cks.

Copper Regulus—

Valparaiso, 71 bgs. Brownell, Lewis & Co.

Dyestuffs—

Orchella

Lisbon, 433 bls. 57 bgs.

Bay Beach, 17 bgs.

Cochineal

Grand Canary, 7 bgs. Kolf & Co.

Teneriffe, 19 bgs. Bruce & White

8 bgs. Swanston & Co.

Gambier

Akassa, 204 bgs. Royal Niger Co., Limited

Extracts

Havre, 7 cks. 2 cs. Cunard S.S. Co., Limited

Philadelphia, 100 bxs.

New York, 9 brls.

10.

Sumac

Barcelona, 50 bgs.

Glucose—

New York, 95 brls.

Hamburg, 15 cks.

Iodine—

Valparaiso, 12 brls. San Sebastian Nitrate Co.

" 42. W. & J. Lockett

" 38. A. Gibbs & Sons

Manganese Powder—

Hamburg, 1 cs.

Phosphate—

Ghent, 204 bgs.

Valle, 472 t.

J. Halphen

Pyrites—

Huelva, 1,405 t.

" 1,728. Tennants & Co.

" 1,593. Matheson & Son

" 1,533. "

Regulus—
Valparaiso, 210 sks.
Stearine—
Baltimore, 250 tcs.
Antwerp, 25 bgs.
Tartar—
Bordeaux, 13 cks.
Verdigris—
Marselles, 23 cs.
Waste Salt—
Hamburg, 50 t.
Zinc Oxide—
Antwerp, 180 brls.

HULL.

Week ending Mar. 6th.

Alumina—
Rotterdam, 41 cks. W. & C. L. Ringrose
Acids (otherwise undescribed)—
Rotterdam, 1 brl. Hutchinson & Sons
Amsterdam, 25 cks. W. & C. L. Ringrose
Albumen—
Reval, 30 cs. Wilson, Sons, & Co.
Barytes—
Rotterdam, 11 cks.
Bremen, 43.
Chemicals (otherwise undescribed)—
Dunkirk, 72 pks. Wilson, Sons, & Co.
Antwerp, 80.
Hamburg, 18.
" 8 cks. G. Malcolm & Sons
Rotterdam, 1. W. & C. L. Ringrose
Dunkirk, 7.
Christiania, 23. Wilson, Sons, & Co.
Bremen, 2. Veltmann & Co.
Rotterdam, 1. Hutchinson & Son
" 4.
Dyestuffs—
Alizarine
Rotterdam, 14 cks. W. & C. L. Ringrose
" 26 pkgs. Hutchinson & Son
" 32. W. & C. L. Ringrose
" 40. Hutchinson & Son
" 10. W. & C. L. Ringrose
" 33. "

Extracts
Rouen, 105 cks. Rawson & Robinson
" 65 20 cs. Wilson, Sons, & Co.
New York, 30. " 5 bls. "
Madder
Rotterdam, 2 cks. G. Lawson & Sons
Rennet
Copenhagen, 8 pks. Wilson, Sons, & Co.

Glucose—
Dunkirk, 49 bgs. Wilson, Sons, & Co.
Hamburg, 5 cks.
" 24. G. Malcolm & Sons
" 33.
Stettin, 57 100 bgs. Wilson, Sons, & Co.
" 1,200.
Hamburg, 10. Geo. Lawson & Sons
" 20. Rawson & Robinson
" 5.
" 7. C. M. Lofthouse & Co.

Guano—
Lyeskil, 3,000 bgs.
Glycerine—
Hamburg, 6 drms.
Manure—
Christiansand, 750 bgs. Wilson, Sons, & Co.

Ghent, 180 t.
Potash—
Rouen, 2 pks.
Rotterdam, 43 cks. G. Lawson & Sons
Pitch—
Rouen, 41 cks. Wilson, Sons, & Co.
Pyrites—
Huelva, 750 t. J. Dalton Holmes & Co.

Plumbago—
Hamburg, 102 cks. Wilson, Sons, & Co.
Stearine—
Antwerp, 13 bgs. Wilson, Sons, & Co.
Salt—
Hamburg, 51 bgs. Furley & Co.
" 50. J. Dalton & Co.

TYNE.

Week ending March 6th.

Glycerine—
Hamburg, 1 ck.
Glucose—
Hamburg, 60 bgs. 12 cks.
New York, 25 brls.
" 50. C. Hassell
Pyrites—
Huelva, 2,026 t. Scott Bros.
Zinc Ashes—
Christiania, 62 bgs.
Zinc Oxide—
Antwerp, 25 brls. Tyne S S. Co.

GLASGOW.

Week ending March 6th.

Alum—
Rotterdam, 41 cks. J. Rankine & Son
Barytes—
Rotterdam, 46 cks.
Dyestuffs—
Alizarine
" 12 cks. J. Rankine & Son
Rotterdam, 40.
Madder
Rotterdam, 10.
Glucose—
New York, 48 brls.
Oxalic Acid—
Christiania, 12 cks.
Saltpetre—
Hamburg, 120 bgs. J. Poynter & Son
Tartaric Acid—
Rotterdam, 1 ck. J. Rankine & Son
Tartar Emetic—
Hamburg, 10 cks.
Ultramarine—
Rotterdam, 2 cks. J. Rankine & Son
Waste Salt—
Hamburg, 200 bgs. J. Poynter & Son
Hamburg, 48 cks.
Zinc Oxide—
Rotterdam, 100 cks. J. Rankine & Son

GOOLE.

Week ending Feb. 26th.

Antimony—
Boulogne, 2 cks.
Caoutchouc—
Boulogne, 3 cks.
Caustic Potash—
Hamburg, 12 cks.
Dyestuffs—
Alizarine
Rotterdam, 51 cks.
Dyestuffs (otherwise undescribed)
Boulogne, 104 cks. 5 cs.
Glucose—
Hamburg, 270 bgs. 53 cks.
Glycerine—
Rotterdam, 10 cs.
Pyrites—
Seville, 1,150 t.
Potash—
Dunkirk, 21 drums.
Saltpetre—
Rotterdam, 325 bgs.
Sodium Nitrate—
Rotterdam, 6 cks.
Tartar—
Rotterdam, 2 cks.
Tartaric Acid—
Boulogne, 3 cs. 1 ck.
Waste Salt—
Hamburg, 508 bgs.

GRIMSBY.

Week ending March 1st.

Albumen—
Antwerp, 7 cks.
Hamburg, 5 pkgs.
Caoutchouc—
Hamburg, 3 cs.
Chemicals (otherwise undescribed)
Hamburg, 4 pkgs.
Dyestuffs (otherwise und. scribed)
Antwerp, 2 pkgs.
Glucose—
Hamburg, 200 bgs. 12 cks.
Manure—
Rainit
Hamburg, 500 bgs.

EXPORTS OF CHEMICAL PRODUCTS

LONDON.

Week ending Mar. 1st.

Ammonium Sulphate—

Ghent,	25 t.	£295
Cologne,	20 10 c.	318
Hamburg,	200	2,301
Ghent,	152 14	1,875
Jamaica,	4	55
Hamburg,	128	1,470
Demerara,	50	500
Hamburg,	50 15	600
Ghent,	60 12	725

Brimstone—

Christiana,	20 t.	£95
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Bisulphide of Carbon—

New Orleans,	20 drs.	£19
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Bone Meal—

Rotterdam,	22 t. 16 c.	£150
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Coal Products—

Pitch

Cette,	1,199 t.	£2,000
Antwerp,	815	1,425
Christiana,	55 c.	18
Odessa,	25 t.	52

Naphtha

Melbourne,	36 drs.	£37
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Benzole

Calais,	80 c.	£202
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Yokohama,

Calais,	10	47
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Carbolic Acid

Mauritius,	11 c.	£77
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Yokohama,

Yokohama,	27	181
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Naphthaline

Stettin,	103 c.	£45
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New York,

New York,	205	144
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Philadelphia

Philadelphia,	201	113
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Trepport,

Trepport,	123	52
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Tar

Danzic,	200 brls.	£195
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Rangoon,

Rangoon,	200 runlets. 299 cks.	273
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Melbourne,

Melbourne,	200 kgs. 30 brls.	54
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Calcutta,

Calcutta,	22 t.	40
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Natal,

Natal,	149 drs. 3 mls. 5½ brls.	£18
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Citric Acid—

Rotterdam,	1 c.	£8
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Hamburg,

Hamburg,	10	76
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M. Video,

M. Video,	1 c.	14
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Libau,

Libau,	2 t. 10 c.	375
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Carbolic Acid—

Yokohama,	1 t. 7 c.	£181
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Mauritius,

Mauritius,	11	77
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Chemicals (otherwise undecoded)

Melbourne,	2 cs.	£25
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Durban,

Durban,	3 t.	23
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Calcutta,

Calcutta,	5 cs	40
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Auckland,

Auckland,	24 pkgs.	32
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New Orleans,

New Orleans,	6 cs.	47
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Carbolic Disinfectant—

Auckland,	10 cks.	£3
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Cream of Tartar—

Brisbane,	12 c.	£67
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Lytleton,

Lytleton,	15 pkgs.	79
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Otage,

Otage,	5 c.	26
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Auckland,

Auckland,	2 t. 3 c.	233
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Caustic Soda—

Lytleton,	1 t.	£20
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New Orleans,

New Orleans,	13 3 c.	45
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Natal,

Natal,	5,040 lbs.	120
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Chloride of Lime—

New York,	1 t. 1 c.	£25
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Copper Sulphate—

Barcelona,	9 t. 15 c.	£205
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Galatz,

Galatz,	71	19
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Chemical Fluid—

E. London,	80 drs.	£213
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Guano—

Colombo,	8 t. 8 c.	£26
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Demerara,

Demerara,	100	1,200
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Guadeloupe,

Guadeloupe,	420	4,740
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Hydrocarbon—

Brussels,	6 t.	£104
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Manure—

Jersey,	15 t. 10 c.	£98
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Hamburg,

Hamburg,	2,000 bgs.	1,800
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Ghent,

Ghent,	50 t.	600
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Cillera,

Cillera,	605 10	6,060
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Jersey,

Jersey,	5	70
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Demerara,

Demerara,	3 2	42
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Dunkirk,

Dunkirk,	15	138
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Dunkirk,

Dunkirk,	100	1,200
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Dunkirk,

Dunkirk,	100	1,000
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Dunkirk,

Dunkirk,	205	2,100
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Dunkirk,

Dunkirk,	58 12	250
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Dunkirk,

Dunkirk,	60	810
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Dunkirk,

Dunkirk,	29 11	330
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Dunkirk,

Dunkirk,	5	75
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Dunkirk,

Dunkirk,	450 5	2,080
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Dunkirk,

Dunkirk,	19 14	200
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Oxalic Acid—

Auckland,	5 c.	£10
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Libau,

Libau,	5 t.	146
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Phosphorus—

Otago,	600 lbs.	£52
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Montreal,

Montreal,	12 cs.	111
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Superphosphate—

Rotterdam,	31 t.	£310
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Saltpetre—

Piræus,	1 t. 5 c.	£26
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Boston,

Boston,	10	20
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Auckland,

Auckland,	5	30
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Salammoniac—

Yokohama,	3 t. 14 c.	£124
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Trebizonde,

Trebizonde,	4	140
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Lisbon,

Lisbon,	12	18
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Sulphur Chloride—

Dunkirk,	6 cs.	£25
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Sheep Dip—

Punta Arenas,	1 t.	£40
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Sydney,

Sydney,	45 pkgs.	97
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Boca,

Boca,	1,550 gls.	195
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Natal,

Natal,	500 dms.	101
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Soda Ash—

Yokohama,	50 t. 1 c.	£225
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Sulphuric Acid—

Jamaica,	9½ c.	£10
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Sodium Acetate—

New York,	10 t.	£155
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Soda Crystals—

New Orleans,	13 t. 3 c.	£45
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Fremantle,

Fremantle,	3 5	10
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Salammoniac—

Galatz,	1 t. 13 c.	£55
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Tartaric Acid—

Lytleton,	3 pkgs.	£19
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Sydney,

Sydney,	8 c.	60
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Auckland,

Auckland,	5	40
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LIVERPOOL.

Week ending Mar. 5th.

Alkali—

Syria,	30 cks.	£5
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Acetate of Chrome—

Vera Cruz,	2 cks.	£5
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Ammonium Muriate—

Havre,	1 t. 4 c.	£20
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Melbourne,

Melbourne,	11 3 q.	13
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Ammonium Carbonate—

Valparaiso,	11 c.	£28
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Hamburg,

Hamburg,	9 1 q.	16
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Odessa,

Odessa,	3 t.	111
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Canada,

Canada,	1 t.	30
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Odessa,

Odessa,	11 14 c. 3 q.	509
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Rouen,

Rouen,	3 1	88
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Ammonium Sulphate—

Nantes,	50 t. 15 c.	£615
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Dunkirk,

Dunkirk,	20	240
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Hamburg,

Hamburg,	24 5	176
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Nantes,

Nantes,	35 5	293
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Odessa,

Odessa,	10	423
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Ghent,

Ghent,	30	120
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Alum—

Buenos Ayres,	10 t. 2 c. 1 q.	£51
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Galatz,

Galatz,	1	5
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Santa Catherina,

Santa Catherina,	5	7
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Buenos Ayres,

Buenos Ayres,	5 6	26
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Havana,

Havana,	8 14	44
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Melbourne,

Melbourne,	1	6
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Seville,

Seville,	1	5
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Alum Cake—

Leghorn,	16 t. 3 c.	£48
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Philadelphia,

Philadelphia,	6 16	20
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Bone Phosphate—

Hamburg,	16 t.	£80
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Brimstone—

Calcutta,	14 c.	£69
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Bleaching Powder—

Sodium Nitrate—			
New York,	16 c.	2 q.	£22
Venice,	9 t.	17	85
Vera Cruz,	5	1	42
Genoa,	12	7	106
Leghorn,	7	15	66

Sodium Silicate—			
Coruna,	17 brls.		
Halifax,	25		
Gothenburg,	4		
Havre,	7		

Sodium Bicarbonate—			
Adelaide,	100 kgs.		
Barcelona,	118 dms.	100 kgs.	
Bombay,	250		
Bordeaux,	60		
Boston,	450		
Buenos Ayres,		80 cks.	
Canada,	100		
Copenhagen,	10		
Genoa,		30	
Hamburg,	50		
Kobe,	200 bgs.		
Lisbon,	60		
Malaga,	25		
Malta,	42 dms.		
New York,	200		
Odessa,	200		
Palermo,	20		
Stettin,	40		
Syria,		20	
Yokohama,	250		
Calcutta,	500		
Genoa,	70		
Kurrachee,	50		
Melbourne,	20		
Mexico City,	50		54
Naples,	140		
New York,		7	
San Francisco,		30	
Trieste,	100		
Valencia,	100		20
Valparaiso,	100		

Soda Crystals—			
Buenos Ayres,	500 brls.		
Gibraltar,	100		
Malta,	50		
Monte Video,	32		
New York,		280 cks.	
Smyrna,	20		
Buenos Ayres,	156		
Hamburg,	80 bgs.		8 tcs.
New York,	747 kgs.		
Rotterdam,	10 cks.		

Soda Ash—			
Adelaide,	76 brls.		
Baltimore,	67 cks.		
Boston,	380	197 tcs.	
Canada,		258	
Chicago,	400 bgs		
Mytelene,	100 brls.		
New York,		987	
Philadelphia,	88	680	
Sierra Leone,	50 bxs.		
Santos,	10 brls.		
Yokohama,	204		
San Sebastian,	2		
Smyrna,	109 brls.		
Adelaide,	40		
Batoum,	34		
Bayrout,	50		
Boston,		37	
B. Ayres,	300 dms.		
Carthagena,	30 brls.		
Cienfuegos,	8		
Ghent,	32		15
Kingsey,			
Maceio,	15		
New Glasgow,		28	
New York,	102		30
Odessa,	75		
Rio Janeiro,	265		
San Francisco,		217	
Santos,	5 brls.		
Sherbro,		34	
Varna,	20		
Yokohama,	100		

Salt—			
Algoa Bay,	5 t.		
Barbadoes,	17		
Bilbao,	2½		
Boston,	340		
Buenos Ayres,	25		
Cape Town,	13½		
East London,	18		
Montreal,	115		
Para,	321½		
Pernambuco,	4		
West Point,	555		
Adelaide,	9		
Alligator Pond,	9		
Antwerp,	200		
Baltimore,	500		
Barbadoes,	50		
Belize,	22		
Boca,	19		

Buenos Ayres,	30 t.		
Cameroon,	109½		
Gaboon,	17½		
Ghent,	300		
Hamburg,	100		
Manaos,	26		
New Orleans,	20		
New York,		10 cs.	
Old Calabar,	59		
Opobo,	41½		
Trinidad,	63	16	
Victoria,	65		

Sulphur—			
Boston,	25 t.	1 c.	£110
Iquique,	52	16	1 q.
Cardenas,	15		337
Sugar of Lead—			
Rio de Janeiro,	5 c.		£67
Sodium Bichromate—			
Havre,	6 t.	18 c.	£205
Superphosphate—			
Hamburg,	277 t.		£887
Sodium Chlorate—			
Hamburg,	2 t.		£112
Sodium Biborate—			
Hamburg,	1 t.	4 c.	£36
Montreal,	1		30
Sheep Dip—			
E. London,	16 c.	3 q.	£34
Sheep Wash—			
Baltimore,	2 t.		£50
Odessa,	3	8 c.	1 q.
Saltpetre—			
Syria,	1 t.	16 c.	2 q.
Salammoniac—			
Amsterdam,	5 c.		£8
Larnaca,	4	1 q.	8
New York,	4 t.	18	160
Genoa,	2	7	82
Alexandria,	5		8
Tar—			
Sierra Leone,	10 brls.		
Zinc Chloride—			
Bombay,	3 t.	10 c.	£55
Piræus,	15		12
Rotterdam,	5	8	36

HULL.

Week ending March 4th.

Alum—			
Christiansand,	621 slabs		
Alkali (otherwise undescribed)			
Libau,	40 kgs.	18 cks.	
Bleaching Powder—			
Danzig,	54 cks.		
Stettin,	57		
Bone Size—			
Harlingen,	15 cks.		
Caustic Soda—			
Antwerp,	37 drms.		
Amsterdam,	50		
Konigsberg,	19		
Libau,	37		
Trieste,	10		
Chemicals (otherwise undescribed)			
Harlingen,	19 cks.		
Konigsberg,		75 pkgs.	
Libau,	1 cs.	20	
Malta,	4		
Messina,		22	
Odessa,	202	25	
Rouen,	48		
Reval,		50	
Rotterdam,	10	32	21
Stettin,	5		
Trieste,	31		
Venice,	11		
Amsterdam,	1	11	
Antwerp,	10	7	5
Bremen,	5		
Barl,	3		
Bergen,	20	1	15
Christiania,	5	2 cks.	6 pks
Dunkirk,	2	6 cks.	161 slbs.
Danzig,	21	155 pkgs.	
Fiume,	6		
Ghent,	4		
Gothenburg,	10		
Hamburg,	22	3	39
Dye stuffs (otherwise undescribed)			
Hamburg,	1 dr.	2 cs.	1 ck.
Reval,	19		
Rotterdam,	3		3 kegs
Manure—			
Aarhus,	190 t.		
Copenhagen,		350 bgs.	
Dunkirk,		99	
Ghent,		1,426	
Hamburg,		935	

Pitch—	
Antwerp,	382 t.
Cette,	1,095
Tar—	
Christiania,	20 cks.
Odessa,	1,220
Rotterdam,	6

TYNE.

Week ending Mar. 6th.

Alumina Sulphate—	
Rouen,	4 t.
Arsenic—	
Genoa,	13 c.
Venice,	30 t.
Copenhagen,	1
Alkali—	
San Francisco,	40 t.
Rotterdam,	1
Gothenburg,	2
Ammonium Sulphate—	
Valencia,	15 t.
Bleaching Powder—	
Lisbon,	10 t.
Antwerp,	106
Hamburg,	60
Baltimore,	49
Lisbon,	11
Rotterdam,	6
Rouen,	20
Gothenburg,	5
Baryta Nitrate—	
Rouen,	5 t.
Barytes Carbonate—	
Rouen,	50 t.
Caustic Soda—	
Baltimore,	159 t.
San Francisco,	161
Christiania,	1
Rotterdam,	1
Rouen,	2
Antwerp,	5
Valencia,	10
Gothenburg,	50
Copperas—	
San Francisco,	200 brls.
Hamburg,	10 c.
Calined Magnesia—	
Lisbon,	5 c.
Ferro Manganese—	
Bilbao,	37 t.
Glycerine—	
Rotterdam,	6 t.
Litharge—	
Hamburg,	4 t.
Gothenburg,	1
Magnesia—	
Hamburg,	10 c.
Genoa,	1 t.
Valencia,	3
Rouen,	3
Magnesium Carbonate—	
Valencia,	11 c.
Potassium Chlorate—	
Antwerp,	3 t.
Hamburg,	10
Rotterdam,	1
Reval,	20
Rotterdam,	6
Pitch—	
Havre,	466 t.
Antwerp,	60
Soda—	
Rotterdam,	30 t.
Aalborg,	52
Odense,	10
Ancona,	22
Nakskov,	13
Malmo,	5
Kjerterminde,	7
Lisbon,	5
Rudkjoberg,	10
San Francisco,	105 t.
Gothenburg,	5
Superphosphate—	
Malmo,	83 t.
Christiania,	5
Aalborg,	1
Esbjerg,	4
Valencia,	55
Soda Ash—	
Genoa,	13 t.
Ancona,	18
Venice,	10
Rotterdam,	13
Sodium Sulphate—	
San Francisco,	25 t.
Copenhagen,	5 t.

Sulphur—	
Bilbao,	2 q.
Rouen,	26 t.
Sodium Hyposulphite—	
San Francisco,	25 t.
Rouen,	2 t.
Tar—	
Hamburg,	20 t.

GLASGOW.

Week ending Mar.

Benzole—	
Rotterdam,	43 puns.
Boracic Acid—	
New York,	221 c.
Carbolic Acid—	
Hong Kong,	22 c.
Caustic Soda—	
Oporto,	29½ c.
Dye stuffs—	
Extracts	
Boston,	
Guano—	
Penang,	76½ t.
Glycerine—	
Rouen,	11 t.
Manure—	
Penang,	25 t.
Oporto,	10
Naphtha—	
Rouen,	
Pitch—	
Bombay,	
Gijong,	726 t.
Christiania,	13½ t
Bordeaux,	917
Potassium Bichromate—	
Rouen,	52 t.
Christiania,	1 ck.
Rotterdam,	145
Hong Kong,	5 t.
Boston,	72½ c.
Paraffin Wax—	
Oporto,	41½ c.
Malta,	5 t.
Nantes,	2,204 lbs.
Rouen,	7 t.
Christiania,	24½ c.
Hong Kong,	71½
Sodium Bichromate—	
Rouen,	9 t.
Sodium Silicate—	
Penang,	1 t.
Salt—	
Brisbane,	100 t.
Sulphuric Acid—	
Bombay,	
Tar—	
Bombay,	23½ t.
Ultramarine—	
Mauritius,	1 t.

GOOLE.

Week ending Feb. 2

Benzole—	
Ghent,	17 drs.
Hamburg,	50 cks.
Rotterdam,	20
Bleaching Preparation—	
Hamburg,	56 cks.
Copper Precipitate—	
Rotterdam,	233 cks.
Dye stuffs (otherwise und)	
Ghent,	1 cs.
Chemicals (otherwise und)	
Antwerp,	2 cks.
Boulogne,	6
Rotterdam,	2
Manure—	
Bruges,	232 bgs.
Ghent,	1,267
Hamburg,	439
Pitch—	
Antwerp,	90 t.

GRIMSBY.

Week ending Mar.

Chemicals (otherwise und)	
Dieppe,	121 pkgs.
Hamburg,	1

PRICES CURRENT.

WEDNESDAY, MARCH 12, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

		£	s.	d.			£	s.	d.
c, 25% and 40%	per cwt	7/6	&	12/6	Lime, Acetate (brown) .. .				8 5 0
Glacial		3	2	6	" (grey)	per ton	14	0	0
mic, S.G., 2000°		0	12	9	Magnesium (ribbon and wire) .. .	per oz.	0	2	3
mic 82%	nett per lb.	0	0	6 1/2	" Chloride (ex ship) .. .	per ton	2	6	3
ric		0	0	3 1/4	" Carbonate	per cwt.	1	17	6
atic (Tower Salts), 30° Tw. .. .	per bottle	0	0	8	" Hydrate		0	10	0
(Cylinder), 30° Tw. .. .		0	2	11	" Sulphate (Epsom Salts) .. .	per ton	3	0	0
c 80° Tw.	per lb.	0	0	2	Manganese, Sulphate		18	0	0
bus		0	0	1 1/4	" Borate (1st and 2nd) .. .	per cwt.	60/-	&	42/6
ic	nett	0	0	3 1/4	" Ore, 70%	per ton	4	10	0
c		0	1	4	Methylated Spirit, 61° O.P. .. .	per gallon	0	2	2
huric (fuming 50%)	per ton	15	10	0	Naphtha (Wood), Solvent		0	3	11
" (monohydrate)		5	10	0	" Miscible, 60° O.P. .. .		0	4	8
" (Pyrites, 168°)		3	2	6	Oils:—				
" (150°)		1	8	0	Cotton-seed	per ton	22	10	0
" (free from arsenic, 140/145°) .. .		1	10	0	Linseed		23	0	0
urous (solution)		2	15	0	Lubricating, Scotch, 890°—895° .. .		7	5	0
ic (pure)	per lb.	0	1	0 1/2	Petroleum, Russian	per gallon	0	0	5 1/4
aric		0	1	2 1/2	" American		0	0	5 1/4
white powdered	per ton	13	10	0	Potassium (metal)	per oz.	0	3	10
loose lump)		4	15	0	" Bichromate	per lb.	0	0	4
ia Sulphate (pure)		5	0	0	" Carbonate, 90% (ex ship) .. .	per ton	17	15	0
" (medium qualities)		4	10	0	" Chlorate	per lb.	0	0	5
ium	per lb.	0	15	0	" Cyanide, 98%		0	2	0
nia, 880=28°	per lb.	0	0	3	" Hydrate (Caustic Potash) 80/85% .. .	per ton	22	10	0
=24°		0	0	1 1/4	" (Caustic Potash) 75/80% .. .		21	10	0
Carbonate	nett	0	0	3 1/2	" (Caustic Potash) 70/75% .. .		20	15	0
Muriate	per ton	23	10	0	" Nitrate (refined)	per cwt.	1	3	6
" (sal-ammoniac) 1st & 2nd .. .	per cwt.	37/-	&	35/-	" Permanganate		4	5	0
Nitrate	per ton	42	0	0	" Prussiate Yellow	per lb.	0	0	9 1/4
Phosphate	per lb.	0	0	10 1/2	" Sulphate, 90%	per ton	9	10	0
Sulphate (grey), London	per ton	11	16	3	" Muriate, 80%		7	15	0
" (grey), Hull		11	17	6	Silver (metal)	per oz.	0	3	8 1/2
Oil (pure)	per lb.	0	0	11	" Nitrate		0	2	5 1/2
Salt		0	0	9 1/2	Sodium (metal)	per lb.	0	4	0
ony	per ton	75	0	0	" Carb. (refined Soda-ash) 48% .. .	per ton	5	15	0
(tartar emetic)	per lb.	0	1	1	" (Caustic Soda-ash) 48% .. .		4	17	6
(golden sulphide)		0	0	10	" (Carb. Soda-ash) 48% .. .		5	2	6
Chloride	per ton	7	15	0	" (Carb. Soda-ash) 58% .. .		6	0	0
Carbonate (native)		3	15	0	" (Soda Crystals)		2	18	9
Sulphate (native levigated) .. .		45/-	to	75/-	" Acetate (ex-ship)		15	15	0
ing Powder, 35%		5	2	6	" Arseniate, 45%		10	10	0
Liquor, 7%		2	10	0	" Chlorate	per lb.	0	0	6 1/4
ide of Carbon		12	15	0	" Borate (Borax)	nett, per ton.	30	0	0
ium Acetate (crystal	per lb.	0	0	6	" Bichromate	per lb.	0	0	3
n Chloride	per ton	2	0	0	" Hydrate (77% Caustic Soda) .. .	per ton.	11	5	0
Clay (at Runcorn) in bulk .. .		17/6	to	35/-	" (74% Caustic Soda)		10	17	6
ar Dyes:—					" (70% Caustic Soda)		9	17	6
rine (artificial) 20%	per lb.	0	0	9	" (60% Caustic Soda, white) .. .		8	17	6
enta		0	3	9	" (60% Caustic Soda, cream) .. .		8	12	6
ar Products					" Bicarbonate		5	17	6
racene, 30% A, f.o.b. London .. .	per unit per cwt.	0	1	5	" Hyposulphite		5	5	0
ol, 90% nominal	per gallon	0	3	6	" Manganate, 25%		9	0	0
50/90		0	2	8	" Nitrate (95% ex-ship Liverpool .. .	per cwt.	0	8	4 1/4
olic Acid (crystallised 35°) .. .	per lb.	0	0	10	" Nitrite, 98%	per ton	27	10	0
" (crude 60°)	per gallon	0	2	10	" Phosphate		15	15	0
sote (ordinary)		0	0	2 1/2	" Prussiate	per lb.	0	0	7 1/4
" (filtered for Lucigen light) .. .		0	0	3	" Silicate (glass)	per ton	5	7	6
e Naphtha 30% @ 120° C. .. .		0	1	5	" (liquid, 100° Tw.)		3	17	6
se Oils, 22° Tw.	per ton	3	0	0	" Stannate, 40%	per cwt.	2	0	0
, f.o.b. Liverpool or Garston .. .		1	12	0	" Sulphate (Salt-cake)	per ton.	1	12	6
ent Naphtha, 90% at 160° .. .	per gallon	0	1	11	" (Glauber's Salts)		1	10	0
ven Oils (crude)		0	0	2 1/2	" Sulphide		7	15	0
(Chili Bars)	per ton	46	15	0	" Sulphite		5	5	0
Sulphate		26	0	0	Strontium Hydrate, 98%		8	0	0
Oxide (copper scales)		51	0	0	Sulphocyanide Ammonium, 95% .. .	per lb.	0	0	8
ne (crude)		30	0	0	" Barium, 95%		0	0	5 1/4
" (distilled S.G. 1250°)		55	0	0	" Potassium		0	0	8
"	nett, per oz.	8 1/2	d.	to 9d.	Sulphur (Flowers)	per ton.	6	15	0
lphate (copperas)	per ton	1	10	0	" (Roll Brimstone)		6	0	0
lphide (antimony slag)		2	0	0	" Brimstone: Best Quality .. .		4	7	6
heet) for cash		14	0	0	Superphosphate of Lime (26%) .. .		2	10	0
itharge Flake (ex ship)		16	0	0	Tallow		25	10	0
acetate (white		23	5	0	Tin (English Ingots)		95	0	0
" (brown		18	10	0	" Crystals	per lb.	0	0	6 1/4
arbonate (white lead) pure .. .		19	0	0	Zinc (Spelter)	per ton.	22	0	0
itrate		22	0	0	" Chloride (solution, 96° Tw. .. .		6	0	0

THE CHEMICAL TRADE JOURNAL.

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

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Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid, are charged at the Tariff rates, which will be forwarded on application.

FACTORY SMOKE.

DURING the past week or two, several correspondent the Manchester papers have exercised their thought in endeavouring to persuade the public that b smoke is preventable, and that efforts should be made to sure its total abolition. Dr. Patterson, from Oldham, ope the ball by suggesting the formation of an association prosecute the offenders. Mr. Fred Scott, the secretary of Manchester and Salford Sanitary Association, followed pointing out that his association had been working at the ject for some considerable time, and that, therefore, all eff towards Smoke Abolition should be centred in that Assc tion. These two letters led to another, by “Engineer,” pointed out the possibility of preventing factory smoke, writing of an exhibition test, where 10 to 11 lbs. of water evaporated per lb. of fuel by one of the well-known mechan stoking appliances. The correspondence having reac this length, Mr. A. E. Fletcher, the chief inspe of alkali works for the Government, entered the li and adduced reasons why something should be done tow the solution of the problem. Another letter signed “Cle ness,” and still another by Mr. J. W. Holden, concludes that has been said within the past few weeks, and it is ceedingly strange that all these correspondents have negle an enumeration of the evils arising from the combustion the sulphur of the coal. Why they should have so negle the sulphurous acid, which is the real damage-doing gredient, it is hard to conceive, but until this evi thoroughly appreciated by our legislators, as well as public, we are afraid the smoke problem will remain solved. It will be of but little use to the general public see the carbon of the smoke totally consumed, and the still laden with those sulphurous vapours which destroy time, almost anything with which they come in contact. correspondent suggests that moderate fines have done good, and by this we presume he would go in for a whole slaughter with heavy fines, and a daily penalty so long the smoke continued. Nothing could be more errone than the belief that such method would lead to good res There are so many smoke producers in the country that one with any sense would dare to tackle them all at one ti and any wholesale system of fining would certainly defea own object in the long run.

There is no doubt but that as the consumption of increases, so will the devastation produced from coal sm also increase, and this may be seen plainly enough in suburbs of all our large towns. Even within the past two years this is only too patent around Manchester, and have also heard our friends make the same remarks regard to London, Birmingham, Leeds, Nottingham, Leicester. None of the correspondents we have alre quoted as writing to the Manchester papers have even hi what they would have us do with the sulphurous acid of coal smoke. We remember some time ago having our at tion called to an invention for washing coal smoke with li by means of which the sulphurous acid was extracted;

as at that day there was no outlet for the sulphite of lime which was produced during the operation, the process fell to the ground. To-day there is a market for sulphite of lime, and the people who were interested in the process at that time might possibly do worse than revive the practice which they tried then to introduce. We do not desire in any way to undervalue the efforts of the Manchester and Salford Noxious Vapours' Association, nor those services which have been gratuitously rendered by the chief inspector of alkali works, but we do say that they have adopted the wrong methods and the wrong arguments, and that if they are allowed to follow their bent in this particular instance, we shall be farther off from the realisation of our wish to abolish smoke than we were before. If we take Mr. Fred Scott's letter we shall see that the Manchester and Salford Noxious Vapours' Association has been in existence for a good many years, but so far as coal smoke is concerned, and the sulphurous emanations which spring from it, we are absolutely worse off than before that Association was formed, and we do not think it can be pointed out that that Association has done anything to reduce the amount of damage due to sulphurous acid. Mr. Herbert Fletcher, who is continually quoted as having taken so much interest in this smoke-consuming question, has, it is stated, six boilers producing steam at his collieries. Now, supposing these six boilers burn between them 100 tons of coal per week; these 100 tons will give not less than three tons of concentrated oil of vitriol, or say 42 carboys a week of sulphuric acid at 170° Tw. Now, then, we say "What has Mr. Fletcher done to prevent damage being caused by the dissemination of that quantity of oil of vitriol over the surrounding neighbourhood?" The emanation of a small proportion of carbon in the form of black smoke cannot possibly cause one tithe of the injury produced by this sulphur in the coal; and when Mr. Fletcher shows us that he has prevented this sulphur from escaping from his chimney—then, and then only—shall we joyfully realise that we are at the beginning of the end.

Respecting Mr. A. E. Fletcher's letter, he puts forward the proposed scope of the work upon which he has set his mind in testing appliances and methods for consuming coal smokelessly; but as we have said all along, we have no faith whatever in the methods by which he seeks to attain his end. It is all very well, no doubt, to hold exhibitions, to issue reports, and to be able to push forward some one or other of the numerous so-called smoke-preventing appliances, but that these will relieve us all our sufferings we do not believe. We may, however, turn to the printed proposed scope of the work. Under the first head we have a collation of the results of past experience. This, no doubt, would be valuable, and could be done by a committee at comparatively small expense, without the aid of any expert, and without the employment of any guarantee fund, and moreover, all experience must be of the past, but we do not see that all such information, cannot be obtained from the records of somebody's working. Under the second head we have examinations or tests, to be conducted by experts appointed by the committee, at places where the appliances for coal consumption are already at work, and this has been subdivided into:—*a*, Practical freedom from smoke; *b*, reasonable amount of duty; *c*, economy of fuel; *d*, moderate cost in wear and tear; and *e*, moderate cost of application. Surely it would be sufficient to select works that are known to be well-conducted, and to take figures, say, for the past fifteen or twenty years, which would be far more valuable than any examination or test conducted by an expert. It must be known to the committee that there are many places where coal is smokelessly burned, and if so, why cannot their practice be imitated? The examinations or tests conducted by an expert we take to be a great waste of money. Over and over again it has been shown that in these tests almost theoretical results are obtained, and yet when carried out in ordinary tale. We could point to the neighbourhood of Manchester, where coal is burned, both with firing; and "E" has hit the

Herbert Fletcher deserves the thanks of all interested in smoke abatement for his efforts to suppress the nuisance, and were all to follow his example, and have plenty of boiler room, there would be little ground for complaint." The fourth heading of Mr. Fletcher's letter is devoted to a report embodying the results of the committee's operations. What has become of the voluminous report of the Smoke Abatement Exhibition at South Kensington? Has that been forgotten, and, if so, is it not quite as likely that any report issued by another committee will be consigned to the limbo of oblivion, too? There are two reasons why the public are half-hearted in the matter of the prevention of coal smoke. Coal smoke pays to produce. The general depreciation of property and things, the killing of our trees and shrubs, the painting and cleaning of our buildings, show us that most tradesmen get something out of the dirt and dilapidation. It is true that those who can afford to do so, live outside the area of the baneful influence of the sulphurous element, but in their ordinary daily toil many of them are dependent upon the work which the removal of the dirt and dust and sulphur produces. The coal merchant wants to sell as much coal as possible, and the carter wants to cart it, and the dustman wants to keep his horses going removing the ashes. The picture dealer and picture frame maker desires work. The upholsterer wishes to supply more curtains and more furniture, which the sulphurous acid has destroyed, and in this manner work is brought all round, and, in our opinion, the evils arising from the combustion of coal will only be forgotten after the question has been tackled by central legislation, or by the enhancement of the value of coal to such an extent as will make people more economical in the future, and not only strive to burn as little as possible, but will endeavour to make use of the by-products which are to be found in the gaseous products of combustion. There is another thing which may help to hasten this time forward. If coal should be found in paying quantities within a few miles of London, it will cause manufactories, mills, and works to spring up in enormous quantities within measurable distance of that city. Coal also will become cheaper there, and much larger quantities will be used for domestic purposes than has heretofore been employed. This will mean such an abominable nuisance to the inhabitants of London that the Legislature will be compelled to interfere, and perhaps when half of the fair lands of Kent have been devastated by the sulphurous fumes of the factories and works congregated round the coalpits there, we may see the time when the combustion of coal will be carried on without causing a nuisance to the inhabitants, and the unit of steam will be raised at a less cost than is now accomplished.

ADVANCE IN THE PRICE OF COAL.

THE very general stoppage of work at the collieries throughout Lancashire has naturally caused prices to be very irregular, outside customers especially paying almost any figure to secure supplies. In the Wigan district on Monday last most of the collieries advanced their pit prices 2s. 6d. and 3s. per ton best coal, which was previously selling at 12s. 6d. to 13s., being now quoted at 15s., and seconds coals have gone up from 11s. 6d. and 12s. to 14s. per ton, whilst in all descriptions of fuel for manufacturing purposes the advance has been still greater, steam and forge coals having gone up from 9s. 6d. and 10s. to 13s. and 14s., burgy from 8s. and 8s. 6d. to 11s. and 12s., and slack from 7s. and 7s. 6d. to 10s. and 11s. per ton. These prices, which, however, are of course only temporary, are being quoted to regular customers; outside buyers have to pay in many instances considerably above these figures, and there are cases where 20s. has been paid for burgy and 15s. per ton for slack at the pit mouth. Two or three of the large colliery firms hold fairly heavy stocks, but generally these are only light. In the Manchester district the leading colliery concerns have not as yet made any actual advance on their list rates, but they have practically ceased booking new orders, and are confining themselves to meeting as far as possible the requirements of consumers who are already customers on their books, merchants and dealers having to seek supplies wherever they can obtain them. In some instances the coalowners' stocks might enable them to keep the bulk of their customers, so far as really urgent requirements for consumption are concerned, going for a fortnight or so, but this is by no means the case in all instances, and the very great pressure for supplies at almost any price is an indication that consumers are already feeling very seriously the effects of the strike.

CHEMICAL ENGINEERING.*

XXIII.

BEFORE concluding my remarks upon pumps generally, when used for the purpose of moving liquids, I would fain direct your attention once more to the formula (see page 154)

$$H = \frac{G^2 L}{(3d)^5}$$

for the head necessary to overcome friction. Mr. G. A. Ellis has calculated the loss in lbs. pressure from friction for a length of one hundred feet of cast iron pipe of various diameters, discharging the stated quantities per minute, and the numbers are given in the following table:—

Imperial Gallons.	INSIDE DIAMETER OF PIPES.											
	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"	10"	12"
4	3.3	0.84	.31	.12								
8	13.	3.16	1.05	.47	.12							
12	28.7	6.98	2.38	.97	.27							
16	50.4	12.30	4.07	1.66	.42							
20	78.	19.00	6.40	2.62	.67	.21	.10					
25		27.5	9.15	3.75	.91	.30	.12					
29		37.	12.4	5.05	1.26	.42	.14					
33		48.	16.1	6.52	1.60	.51	.17					
37			20.2	8.15	2.01	.62	.27					
41			24.9	10.00	2.44	.81	.35	.09				
62			56.1	22.40	5.32	1.80	.74	.21				
83				39.	9.46	3.20	1.31	.33	.05			
103				48.1	14.9	4.89	1.99	.51	.07			
124					21.2	7.00	2.85	.69	.10	.02		
145					28.1	9.46	3.85	.95	.14	.03		
166					37.5	12.47	5.02	1.22	.17	.05	.01	
207					47.7	19.66	7.76	1.89	.26	.07	.03	
249						28.06	11.20	2.66	.37	.09	.04	.005
290						33.41	15.20	3.65	.50	.11	.05	.007
332						42.96	19.50	4.73	.65	.15	.06	.01
373							25.00	6.01	.81	.20	.08	.02
415							30.80	7.43	.96	.25	.09	.04
621								14.32	2.21	.53	.18	.08
830									3.88	.94	.32	.13
1037										1.46	.49	.20
1245										2.09	.70	.29
1450											.95	.38
1660											1.23	.49
1867												.63
2075												.77
2490												1.11

The foregoing numbers will only hold good for a mobile fluid such as water or crude petroleum, and it is presumed that the pipe is a straight one and free from bend or irregularities. If it is desired to work out the friction for other lengths and quantities expressed in pounds pressure per square inch, the following formula will give the same:—

P = pounds per square inch.

$$P = \frac{G^2 L}{2.3 (3d)^5}$$

The numbers given by Ellis do not compare exactly with those calculated from the above formula, but nevertheless, they are sufficiently near for all practical purposes.

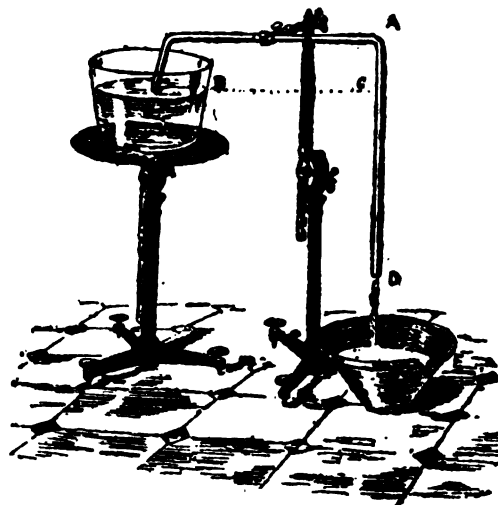
An inspection of the table will show its usefulness—suppose it is desired to pass 1,200 gallons per hour through a pipe one hundred feet in length, from one tank to another situated at a lower level: the table tells us, that if a pipe of one inch bore be used, the head necessary to simply overcome friction is equal to 19 pounds pressure, or 43.91 feet of water. The formula says 54 feet, and it would be safer to take the larger figure. If, however, a three-inch pipe be employed, the head necessary to overcome friction is but 0.1 pounds or 0.23 feet of water. This illustration is quite sufficient to show the importance of careful attention to the bore of pipes used in connection with pumps and other water raisers.

There is one more matter that should be mentioned in connection with the movement of liquids, and which should

be more carefully studied by both workman and superintendent alike, as it has many uses in connection with chemical plant and apparatus—I now allude to the employment of old time-honoured syphon—and the bearing it has upon working of many processes. It is necessary to mention as strange misconceptions regarding its principle of action are to be found everywhere it is employed. I have only with one man, who imagined that he could syphon a liquid up hill, but I have met with many who have fancied they could increase the flow by lengthening the longer limb in a horizontal direction.

The syphon is often used for drawing off a clear liquor from a deposited sediment; for emptying tanks where no apertures are available, such as the rectifying glasses, containing oil of vitriol and many similar operations.

The construction of the syphon scarcely requires illustration; it usually consists of a bent metal or glass tube, the short end of which dips into the liquid to be drawn off, shown in the accompanying illustration. The syphon



“set” in several ways; first, and most usual by filling completely with the fluid it is desired to withdraw, and quickly (and without allowing any to escape) inverting the short limb into the fluid. The height of the point A, shown in the illustration, above the line C—B, must always be less than the head of water due to the barometric pressure at that time, as there is a certain amount of head consumed by friction in passing from B to A, and from A to C; this friction increases, of course, with the quantity of fluid passing in given time, and this quantity is regulated by the bore of the syphon, and the height from C to D, that is supposing the pipe joining these two points to be perpendicular. Another method of setting a syphon may be seen in the method usually adopted in emptying or “running off” the contents of the rectifying glasses in the manufacture of D O V. In this case the syphon—usually of small bore, say half-an-inch—is placed with its short end dipping below the surface of the vitriol in the retort, the long end is temporarily connected with a small portable leaden air-pump, one stroke of which withdraws the air from the syphon, the fluid following immediately, when the pump is instantly disconnected.

In filling carboys or drums by means of the syphon, the end of the longer limb is furnished with a tap to stay the flow at the right moment.

There are many modifications and methods of fitting the syphon in actual practice, and perhaps many more will suggest themselves to the true technologist who has to work with them. Reference to the illustration will show a very common method of starting and stopping the syphon when and as required. So long as the level of the liquor C—B is above the point D, the flow is through B, A, C, D; but if by any means the level E is raised to C—B the flow at once stops, though the syphon remains full of fluid, ready for immediate action so soon as the level E is made to fall below

* A course of lectures delivered by Mr. George E. Davis at the Manchester Technical School. All rights reserved.

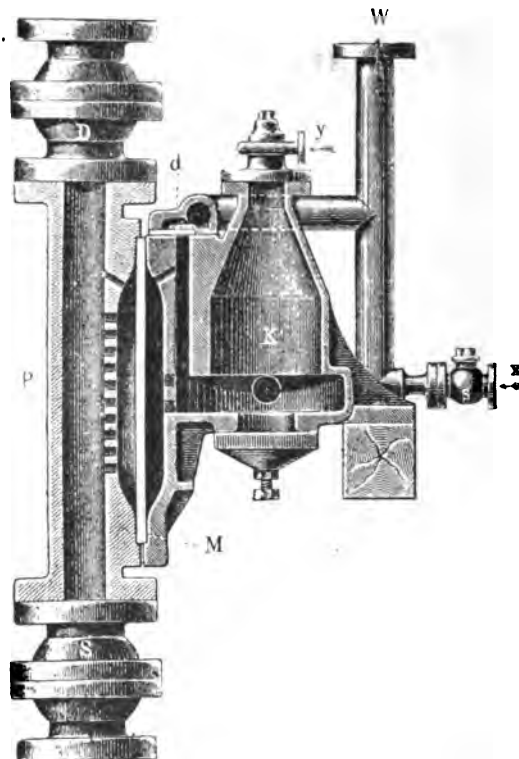
B. This is brought about by suspending a cylinder F and the lower end of the longer limb of the syphon, by a in passing over a pulley; when the top of the cylinder is right above the level C—B the syphon ceases to flow, but immediately starts again when the line E—E is brought over C—B. The formula already given as to loss of head friction, for velocity of efflux, and for the number of tons delivered per minute or per hour, will apply equally to syphons, so that the student may find plenty of exercise working out problems of his own devising.

So far, we have only considered a fluid such as water, in which the difficulties of construction of the apparatus are reduced to a minimum, but in chemical operations, the fluids to be dealt with are generally more or less corrosive, that the ordinary pump is utterly unsuitable. In such cases special appliances have been devised for raising corrosive fluids, such as, for instance, oil of vitriol, to the top of absorbing and denitrating towers, or weak hydrochloric acid to the top of condensing towers. An ordinary pump would not do for these operations, so an egg and force pump in general use for the first of these operations. The egg and force pump is constructed on the principle of the laboratory wash bottle, the iron egg replaces the flask, and an air ce-pump is substituted for the human bellows. The pressure necessary to force up a fluid of known specific gravity, may easily be calculated from the foregoing formulæ, there are several matters in this connection that require very careful attention on the part of the designer. The first is the strength of the egg and the connecting pipes, and the second is the pattern of the valves and taps used in connection with this system, and when I tell you that within my own knowledge five men have had their eyesight partially destroyed by imperfect apparatus, a careful study of all the various parts will perhaps not be considered unnecessary. The eggs used in vitriol forcing generally contain 40 cubic feet of acid, they are of cast iron, and weigh each about 10 cwt.; some are cast in one piece, while others have a lead piece (in which the greatest wear and tear takes place), it can be removed and replaced when worn out.

The pumping of liquid muriatic acid has led to a variety of inventions in order to overcome the difficulties of the operation. Muriatic acid, or to be more scientifically correct, hydrochloric acid, forms soluble salts with nearly all the metals, hence the unsuitability of the ordinary metals for pumps having to deal with this fluid. Earthenware and glass vessels on several occasions have been employed for this work, but the risks of fracture and consequent other damage have always been considered too great for ordinary practice, brass is a very good material for acid pumps, and perhaps, some day, our constructive engineers will appreciate its advantages.

But in pumping such liquids as hydrochloric acid, acetic acid, nitric acid, and a few other corrosive compounds, the pump is not the only difficulty, the suction and delivery pipes are often a sore trouble, to some extent this has been got over by the use of ebonite pipes, and still more frequently by reading a length of india-rubber tubing through an iron pipe, a little larger in internal diameter than the outside diameter of the rubber tubing, in order to support it laterally under the necessary pressure. Weak acids of the foregoing character are generally transported through thick leaden pipes; they wear away in time by internal corrosion, and when this state is reached, they are taken down and replaced with new. Lead, as a rule, does not wear away evenly, and, of course, breaks down where most corrosion has taken place, when this occurs, the old lead is melted up, and is a good set-off against the cost of the new lead. Iron when pulled out is most useless, except for sale as scrap.

At one time very large quantities of liquid muriatic acid of specific gravity (5° Tw.) were run away to waste, because no suitable pump had been devised capable of forcing it to the top of the strong or acid making towers. Mr. Hazlehurst, Runcorn, paid considerable attention to the subject, and produced a pump answering the purpose, which sounded a key-note to others who have taken up and improved on his invention. The diaphragm pump as now made in many is shown in the annexed illustration.



The subject of the moving of liquids is not nearly exhausted, but the main points have been stated, and the student will now be able to do most of his work by rule of three; we may therefore pass on to the transportation of gases.

(To be continued.)

THE SITUATION IN WIDNES.—The works are gradually closing down and the men being discharged daily, as their supply of slack gets used up. Some of the works can now only keep in their boiler fires, and by the end of this week nearly all the furnaces in Widnes will be extinguished.

URANIUM.—About six months since the discovery was announced of a lode of the rare metal uranium at the Union Mines, Grampond Road, Cornwall. This is believed to be the only known lode of that metal in the world, as it had previously been found only in isolated pockets and patches. Since the discovery was made steps have been taken to develop the lode, and to work the mine for this metal. Experimental works for producing the metal from the ore were fitted up in London, and there the ore has been submitted to treatment in order to determine the best and most economical method of extracting the metal from it. The experimental stage is now stated to have been passed, and the commercial production of the metal is being started at the works which we recently visited. In extracting the metal the ore is first roasted and then crushed to a fine powder. It is then dissolved in acid and precipitated by the aid of certain chemicals. The precipitate is then filtered, and that precipitation is dried and pounded, the result being a yellow powder, which is the commercial oxide of uranium. There are mainly two oxides of this metal, the sesqui-oxide, which is yellow, and the protoxide, which is black. The former of these is employed in glass manufacture to produce a beautiful golden colour, and, in conjunction with other minerals, opalescent tints. The protoxide is used in the production of costly black porcelain. The uranium occurs in the lode in Cornwall as a sesqui-oxide, the yield ranging from 18 to 29 per cent. of metal. The yield at the works is stated to be about 18 per cent. from the lode near the surface which is now being worked, the products being sold to glass manufacturers. The market price of the metal is about £2,000. per ton, which is an indication of its rarity. There are other applications of the metal in contemplation by the company. Now that it can be obtained in quantity it is proposed to substitute it for gold in electro-plating, for which purposes it is well adapted. Possessing, as it does, a high electric resistance, it is also expected to prove very useful in electric light installation. The present works are capable of turning out about half a ton of uranium per week.

Industrial Celebrities.

JAMES SHANKS.

VII.

In Lancashire, James Shanks, as the managing partner of Crossfields Bros. & Co., has won for himself the name of being an exemplary works' manager. In this capacity he signalised himself by great industry, energy, tact, and uprightness. For years he made a point of being at the works before the six o'clock bell rang of a morning, he watched the workmen file in to their duties, and if any unfortunate laggard was a few minutes late, he would be greeted with ironical obsequiousness by his master taking off his hat, bowing to him, and saying, "Good morning, sir!" But Shanks was not only an admirable superintendent of men and director of works, he was an excellent practical chemist, and although possessed of but little of the marvellous inventive genius of William Gossage, he was fertile in resource, and has associated his name with one invention of great and abiding utility in the manufacture of alkali, the "Shanks' Vat."

James Shanks was born at Johnstone, in Renfrewshire, on the 24th April, 1800, his father, William Shanks, who belonged to Fife, was a practical millwright and engineer, in the year 1807 he came to Linwood, a small village in the neighbourhood of Johnstone, to erect and fit up a cotton mill, his ability was discerned, and he was made a partner in one of the large cotton mills of Johnstone. He continued his engineering work, and made machinery for the whole district. He had six sons, all of whom were trained up to a practical acquaintance with his business. James Shanks, therefore, had the sound practical training of a mechanic's shop, and the engineering knowledge and experience he there acquired proved of great value to him in after life. The routine of the shop was an admirable school for the man who was to make his mark as a capable and highly successful chemical manufacturer. The father selected James, his eldest son, to enjoy the advantages of a University training and to study for the medical profession. He remained at home, assisting his father and learning his business until he was of age, he then proceeded to Glasgow University, and in due time obtained his diploma. Returning to Johnstone, he there entered on his professional career, and, for two or three years, was the young doctor of that small manufacturing town. During his medical studies at Glasgow, Dr. Andrew Ure was the professor of chemistry, under whom it was his privilege to be placed.

About the time that Shanks went to Glasgow (1821), Ure was bringing out the first edition of his "Dictionary of Chemistry."

Ure was a native of Glasgow, having been born in that city in 1778. He was undoubtedly an admirable teacher, his works indicate great labour and research, and he was specially accurate in all he did. It is recorded, "he was remarkable for his accuracy in chemical analysis, and it is asserted none of his results have ever been upset."

In these days, in almost every walk of life, men are compelled to be specialists, they have to select some subject with which they shall become thoroughly and profoundly acquainted, but a few of the great names of the past generation have taken a wide survey in the world of science, and Ure was one of these.

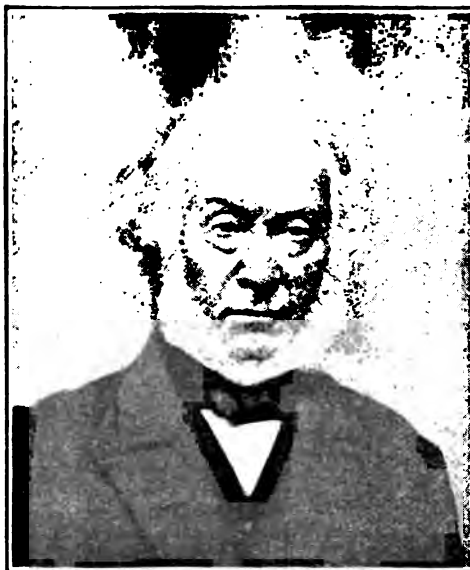
In 1818 appeared his "New experimental researches on some of the leading doctrines of caloric, particularly on the elasticity, temperature, and latent heat of different vapours, and on thermometric measurement and capacity." This subject was brought before the Royal Society and published in their annual transactions.

In 1829, he published his work entitled, "System of Geology," and also works on "The Philosophy of Manufactures," and "On the Cotton Manufactures of Great Britain."

Then in 1830 and 1831, he gave to the world his great book, "The Dictionary of Arts, Manufactures, and Mines," which has gone through several editions, and been translated into most of the European languages. He was the intimate friend of Sir Humphrey Davy, Dr. Wollaston, and Dr. E. D. Clarke. He was a member of the Astronomical Society, and other learned and scientific societies. At Glasgow, he succeeded Dr. Birkbeck as Andersonian Professor of Chemistry. This, then, was the master under whom Shanks studied,

an enthusiastic teacher, accurate, painstaking, laborious, a man of broad culture and wide views, an author who occupies a first rank technological literature, and whose name we associate with Paye Knapp, Wagner, Watts, and Muspratt. Shanks was always of an enthusiastic nature, there was a genuine glow of healthy enthusiasm everything he took up. When he returned from the University, he brought with him some of his master's spirit, and in connection with the Mechanics' Institute at Johnstone, he used to give scientific lectures always to crowded audiences. Whether it was that chemistry had greater attractions for him than medicine, or whether the pecuniary advantages which the career of a chemical manufacturer appeared present to him were greater, we know not, but he decided to abandon his profession and started a small Chemical Works in Paisley, where he manufactured Alum and Chromate of Potash. This early venture was not a success, and Paisley was left; a situation was accepted at Worcester, where he remained only a very short time, taking another appointment at Newcastle-on-Tyne. His force of character, intelligence, and shrewd common sense, as well as his scientific attainments, were not long in being discovered, and in 1836, when William Gossage was bringing out his valuable inventions, he needed thoroughly capable and intelligent men to erect the plant and carry out the processes designed. Two of these Gossage selected were Shanks and Elliot. Elliot afterwards became associated with Russell, and were the inventors of the revolving black-ash furnace. Together they managed the Greenbank Alkali Works, at St. Helens, where they worked the Longmaid's Soda Process. It is said that Elliot was the first to introduce into Lancashire the Scotch lixiviating vat, which Dunlop had first worked at St. Rollox. Shanks was employed by Gossage in putting up his condensing towers, and his plant for the recovery of sulphur from vat-waste, and whilst thus engaged, he was sent to St. Helens to construct these works for Gamble and Crossfields. The firm, needing some one to assist Josiah Christopher Gamble in the practical management of their works, as his health was failing, they retained the services of James Shanks. When Gamble retired from the partnership with Crossfields, Shanks remained with them, and was made a member of the firm of Crossfields Bros., and Co., a position which he filled long as he lived.

In the spring of 1841, about the time of coming to St. Helens, he took out his first patent, for improvements in the manufacture of carbonate of soda. These he specifies as being, first, the placing of black-ash in impure carbonate of soda in fragments, on trays in chamber, making it moist, and passing carbonic acid gas through it, until the whole of the soda and lime is carbonated. Second, a lime made from the black-ash is made to percolate through a bed of pebbles, through which carbonic acid is being passed. The soda perfectly carbonated when the liquor has its greenish yellow colour. He says this method of carbonating the soda is preferred. Mr. John Brock writes, he found the patent being worked at Crossfields' works

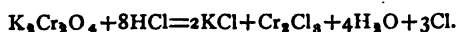


JAMES SHANKS.

when he went to them in 1857, and that it was continued until the works were closed. During the year 1853 and 1854, when Gossage had, by his inventions, quickened into life and activity the whole trade, Shanks shared in the enthusiasm of that chemical revival, and more patented a process for improvement in the manufacture of alkali from common salt. His idea was, that he could work a practical process of producing sulphate of soda by mixing together, alkali waste, common salt, and small coal, using sufficient clay and water to give them cohesiveness, and then heating this mixture in kilns resembling pyrites burners. We have no record that this attempt was attended with any measure of success. One of Shanks' friends was a German Baron von Seckendorff, who lived at Dresden, he was a man of scientific leanings, and inclined to invention, and he appears to have persuaded Shanks to take out for him in this country a patent for an improved mode of manufacturing sulphuric acid. His project was to decompose sulphate of lime, natural or artificial, by means of chloride of lead, and to form chloride of lime and sulphate of lead, then to decompose sulphate of lead with hydrochloric acid, and obtain chloride of lead and sulphuric acid, which was drawn off and concentrated. We fancy it must be cited as one of the instances of Shanks' good nature that he allowed himself to stand sponsor for this idea of his friend. In September, 1858, Shanks patented a process of preparing chlorine by the use of chromate of lime. He placed a quantity of chromate of lime in a stone or other still, and to it added hydrochloric acid, until the

came of a grass green colour, when about half the chlorine added, heat was applied by steam or otherwise, either externally, as is commonly practised in bleaching-powder stills. The residue, chromate of lime was recovered by running it into a quantity of hot water and lime, by preference milk of lime, to neutralize the acid, and adding a further quantity of lime to precipitate the oxide of chromium, and an excess to combine with the chromic acid obtained in the calcination of the precipitate, for the precipitate is collected in a drainer, and afterwards manipulated in a vat at low redness, with a free admission of air, chromate of lime is covered ready to perform its part in the repetition of the original process in the production of chlorine.

This patent a medal was awarded Shanks by the Jury of the International Exhibition, 1862, and Dr. Hofmann, the reporter, refers to it in his report. He says:—"The reaction between hydrochloric acid and chromate of potassium is well known, chloride of potassium, chromic chloride and water being formed with liberation of chlorine:—



Pelillot and M. Gentéle have recommended this process for the production of chlorine upon a large scale, but unless there be a drain for the chromic chloride the reaction would probably prove costly.

An analogous process, patented by Mr. Shanks, appears to be much more practicable. This process consists in submitting hydrochloric acid to the action of chromate of calcium, the products being chloride of calcium, chromic chloride, water and chlorine.



Mr. Shanks' process the chromic oxide acts as a carrier between the oxygen of the air and the hydrogen of the hydrochloric acid. He does not obtain, however, so much chlorine as the manganic oxide produces from the same quantity of hydrochloric acid. For whereas the action of manganic oxide is 16 equivalents of hydrochloric acid to 8 of chlorine, Mr. Shanks' process only eliminates 6 equivalents of the same quantity of hydrochloric acid.

It is a question only to be solved by experience on a large scale, whether the cost of roasting the mixture of chromic oxide and lime will exceed the value of an equivalent quantity of manganese.

It is also doubtful whether the expense of precipitating by lime and filtering be not greater than the expense involved in the regeneration of the oxide of manganese from the manganese residues.

Looking into consideration all these circumstances, it seems improbable that this process, ingenious as it is, will be extensively adopted.

We now know how accurate this forecast was; still the patent is an evidence of Shanks' inventive ingenuity.

The only other patent with which his name is associated is one "to improve the manufacture of caustic soda and caustic potash," taken on December, 1863.

His process is thus described:—"First, the dessication and oxydation (in such oxydation is required) of a mixture of carbonate of soda or potash, as the case may be, by heating the same in a reverberatory furnace, or other suitable apparatus with access of air, and then producing a dry compound in a state favourable for the extraction of caustic soda or caustic potash by lixiviation and filtration. Solutions of carbonate of soda or solutions ordinarily occurring in the manufacture of glass, and known as blackish liquors or red liquors, are employed. These solutions are not already in a state of saturation, or nearly so, are concentrated until carbonate of soda crystals begin to deposit, and the quantity of carbonate of soda contained in the liquid is ascertained, and about forty-two parts of caustic lime is added for each four parts of carbonate of soda present therein, and mix them well together. A violent reaction takes place, and the mixture becomes a mass. This is treated as above until it no longer shows the presence of sulphide. In working with solutions of carbonate of potash, forty-two parts of caustic lime are used for each seventy parts of carbonate of potash.

Second, the abstraction of solutions of caustic soda and caustic potash such as the above, by lixiviation and filtration, such solution being thereby obtained at higher gravities than similar solutions hitherto been obtained from mixtures of solutions of carbonate of soda or carbonating of potash with lime. The dry powder withdrawn from the furnace is mixed with water or with weak solution of caustic soda, and by injection of steam therein, together with thorough agitation the mixture is reduced to the consistence of cream; this mixture is transferred on to a filtering bed, under which a partial vacuum is established.

When the filtration has proceeded to such an extent that the solid residue is no longer covered with the supernatant fluid, water is made to flow into the filtering vessel, so as to keep the solid matter constantly covered with liquid, and continue such addition of water until the solution running off is free or nearly free from caustic soda.

This patent appears never to have gone beyond the experimental stage; we cannot learn that the process was ever adopted in the works.

The one process with which Shanks' name is permanently associated is not connected with any patent. When he came to Lancashire, and for some years afterwards, he found in use the old apparatus employed for lixiviating the black-ash, but when he undertook the management of Crossfields' works, he introduced the system of vats which to the present day everywhere goes by the name of "Shanks' vats."

The lixiviation of black-ash would at first appear to be an exceedingly simple matter; it is, however, one of the stages in the production of alkali requiring great care and attention. The main points to keep in view are:—

1. To secure a good production, by washing out completely the soda contained in the black-ash.
2. To get as much as possible of the soda out as carbonate.
3. To get concentrated liquors.

To achieve these ends, it has been found that the lixiviation should be performed:—

- (1). As quickly as possible.
- (2). With a minimum quantity of water.
- (3). At as low a temperature as possible.

There have been three arrangements of apparatus for the purpose.

The first, the oldest, and the one which was universally used in Great Britain, consisted of tanks arranged tier above tier. The black-ash was put into the lowest tank, and after being washed with the lyes from the tanks above it, yielding a concentrated solution, the black-ash was emptied by hand labour, with spades from the lowest tank to the one next above it, and so on, but this operation was tedious, costly, and ineffective. It entailed much labour in emptying the black-ash from one vat to another, the handling of the ash caused the balls to break up and so become dense instead of retaining their porosity, and the moist residues were exposed to the air, and so the sodium carbonate was to some extent decomposed. The principle of this method was nothing more than mere filtration.

The second arrangement was one invented by Clement-Désormes. It was principally used in France, Germany, and Belgium. We believe that Muspratt was the only English manufacturer who ever adopted it. Clement-Désormes' method was to place the black-ash balls in perforated boxes that were suspended in tanks, so that the solution in the tanks, when they were full, just covered the black-ash in the boxes.

Clement-Désormes had observed that any substance dissolves more rapidly when placed near the surface of the solution than when at the bottom, the reason being manifest, the more material dissolved the greater the density of the solution, and the denser portion sinking, causing the lighter and less concentrated to rise and so come in contact with the substance, or if the tank was being regularly supplied with fresh water or weak lye, then the more dense sinking to the bottom was drawn off into another vessel by a pipe from the bottom.

In some respects this was a great improvement on the original plant; it prevented the breaking to so great an extent of the black ash balls, and they retained more of their porosity: it also prevented the exposure of the ash to the air for any length of time; but the plant took up too much room, was costly, and entailed too much labour in working, still in some places on the Continent it has only been abandoned during the latter years.

The third arrangement or "Shanks' Vats" is the one now universally adopted in Great Britain. Wagner, who was professor of technology at Wurtzburg, and whose work, "Chemical Technology," which is translated and edited in this country by William Crookes, F.R.S., states:—"Mr James Shanks, of St. Helens, Lancashire, was the first to found a rational and economical plan of lixiviation, on what is termed methodical filtration, based upon the fact that a solution becomes more dense the more saline matter it has in solution, and that a column of weak ley of a certain height equilibrates a shorter column of a stronger ley;" but Lunge, in his treatise on the manufacture of alkali, states:—"It was usual to call it Shanks' lixiviating process, after A. W. Hofmann, in his report by the Juries of Exhibits in the International Exhibition, 1862—page 22 of the report, upon the authority of Mr. Gossage, had unconditionally claimed the honour from the late Mr. James Shanks, of St. Helens.

Muspratt had previously asserted (in his Dictionary II. p. 926), that he knows it is a foreign invention which was introduced by Mr. C. T. Dunlop, into the St. Rollox Chemical Works, about the year 1843, "but Hofmann's statement was almost universally credited." Lunge then proceeds to say:—"This cannot be done now since Scheurer Kestner (in the 'Bulletin de la Société Industrielle de Mulhouse', February 28th, 1868), has completely elucidated the matter, and proved Muspratt's statement to be substantially correct." He reports, that in October 1856, he had visited Messrs. Tennants' works, on a journey to Scotland, in company with Mr. Gundelach, Mannheim.

Mr. Dunlop then showed them the apparatus working by displacement of the liquor, just in the same form as to-day, and stated to them

that it had been at work for more than ten years (this agrees with Muspratt's year 1843); moreover, Mr. Dunlop told them that he had constructed the apparatus in consequence of advice given him by Mr. Gundelach, on a previous visit. Mr. Gundelach now informed Mr. Scheurer Kestner, that the original idea had been given to him by the well-known physicist, Professor Buff, of Giessen, who a few years before had made a few experiments with it at Kestner's works at Thann, to which no further development was given; on the strength of these, Mr. Gundelach had given that advice to Mr. Dunlop."

This explanation by Lunge would appear to prove that to Shanks did not belong the honour of priority of invention.

In the report of the Juries, page 22, there is a note which says:—"The reporter makes this statement upon the authority of his friend and brother juror, Mr. William Gossage, who had most attentively watched the development of the soda manufacture. It deserves, however, to be noticed, that the honour of invention is claimed by others." Notwithstanding Lunge's explanation, we are not prepared to deny to Shanks the originality, if not the absolute priority of his vats.

The claim of Dunlop was not unknown to Gossage when he asserted Shanks' right to the place of honour; neither is it likely that he could have been ignorant of the fact that Elliot had also introduced similar vats into the works under his management, for, as we have previously remarked, Elliott was in his employ, and he would be thoroughly acquainted with all improvements that were taking place. He would never have authorised the award of honour to Shanks had he not known—if not in the absolute originality of the idea, at least in the perfection of its application—that Shanks was fully entitled to it. On the authority of Mr. Brock we can state: "Mr. Shanks did not patent them (the vats, &c.), but I have frequently heard him express regret at not having done so."

If James Shanks had not been perfectly convinced that he was the inventor of his vats he would never have expressed regret that he did not adopt and patent as his own the invention of another. Probity and sterling uprightness were strong traits in his character: he was not the man to accept honours and awards which he knew belonged to others; and if Hofmann or Gossage were mistaken, Shanks would have corrected their error, and given the honour to whom it was due.

Professor Buff's suggestions and experiments, to which Lunge refers, do not appear to have been thought very much of by Mr. Gundelach, for they were not followed up or developed by him; and Professor Buff's own colleagues, Drs. Henry Will and Hermann Kopp, the Professors of Chemistry at Giessen, have no knowledge of Dr. Buff having considered himself as the originator of the perfected method of lixiviation. Dr. Buff is no longer with us: we cannot refer the disputed point to him for further elucidation; and we do not feel justified in reversing the verdict of the best instructed and most experienced contemporaries, and shall most certainly attribute to Shanks the honour of being one, at least, who was mainly instrumental in introducing the present perfect arrangement and method of lixiviation, and shall continue to apply to them the term "Shanks' Vats," and not, as Lunge suggests, "Buff-Dunlop Vats."

"Shanks' Vats" have proved successful in accomplishing all that was sought in perfect lixiviation;—

- 1st. Rapidity of solution.
- 2nd. Little water employed.
- 3rd. Low temperature,

and they have secured:—Good production; minimum of decomposition; greatest concentration.

As the arrangement is capable of extended application, we draw attention to Lunge's remarks (II., page 468), where he says, "In the soda manufacture, and following its example, in many other cases, the circulation of the liquid is caused without any mechanical assistance, simply by its hydrostatical pressure. Singularly enough, this matter, extremely simple as it is, is wrongly explained in Hofmann's Report by the Juries. There the principle of the liquor-motion is reduced to the fact that solutions become heavier as they become richer, and that any given column of a weak solution is balanced by a shorter column of a dense one. Hence, in a series of horizontally disposed lixiviating vats, the water level will be lower in each successive vat, viz., highest in that receiving pure water, lowest in that containing saturated liquor. Thus, though the vats be horizontal, a "working declivity" of from 12 to 15 inches is stated to be gained. Now, a declivity, of course, exists, but not a "working" one; the liquor cannot flow from the weaker tanks to the stronger ones, although their level may be very different if this difference is only caused by that in the specific gravities of the solutions. In the connecting tubes, &c., a certain amount of friction has to be overcome by a corresponding pressure, the tanks must be made higher, and those openings from which the strong liquor issues must be made low enough to satisfy not merely the difference of level between the water and the strong liquor, but also the pressure required for overcoming the friction. *The head of water between the top of the tank and the lateral exit opening is the real moving principle; if it is made too low, or, if by a partial obstruction of the connecting pipes*

the friction is increased, the weak tank will run over before the strong one begins to run."

Dr. Hofmann concludes his remarks on this subject by observing "It is not only in the manufacture of soda that the process of methodical lixiviation is applicable. It is available in all branches of arts and manufactures, for the economical collection and concentration of kinds of soluble matter, whenever such matter is diffused in small proportion throughout the substance of bulky, porous, insoluble materials."

Considered, then, in its general bearings, methodical lixiviation, perfected by Shanks, in continuation of Désormes' ever-memorable improvements, is undoubtedly entitled to rank among the most valuable and beautiful of the great typical processes in applied chemistry; and it will probably be regarded by posterity as one of the most important industrial bequests of our age."

Associated with Shanks in the working of the business was Simon Crossfield, who was a kindly, easy-going man; he attended to commercial routine, but it was Shanks who put all fire and "go" into the concern.

He took into his employ, as a young man, in the year 1857, John Brock, in whom he found a man after his own heart, and who he trained to be his successor; what the character of that training was is seen in the establishment and management of the British Alkali Works at Widnes, which has been under Mr. Brock's direction since its commencement.

Shanks and Simon Crossfield were both generous men; the devoted competition of the present day, with its watchword of "survival of the fittest," and its policy of crushing down into extinction the weak, would have ill accorded with their natures or their principles; certainly they lived in times when the struggle for existence did not appear to be so fierce as it is to-day, but for all that we can scarcely conceive such a revulsion of ideas and sympathies in these men, who, instead of crushing down a weak competition, are known to have given valuable assistance to a young firm just starting in the same business. An unselfish, chivalrous spirit manifested itself sometimes on those days, which might well be treasured as an inheritance more precious even than the most splendid inventions.

"Do as you would be done by," was not then considered exploded fallacy.

Amongst his workpeople Shanks was a strict disciplinarian; there was no laxity or want of vigilance in his management, he expected every soul in his employ to do his duty—he was everywhere he looked into, not merely at, everything. Still he was very tenacious and felt deep sympathy with the labouring classes. In the poor ever had a large-hearted and wise friend, and by those in employ he was most highly respected, one might almost say beloved.

James Shanks will ever be remembered by those amongst whom he moved as one of the cheeriest and most genial of men, full of kindness, and possessed of a quaint bright humour; fun twinkled in his eye, and even in his more serious moods there was a sprightly playfulness in his manner.

He paid little attention to mere conventionalities, and of appearance he was utterly regardless. He might be often seen driving through town with articles on the seat of his open carriage that he had chanced at his baker's or his grocer's.

He was no worshipper of the Sartor; the importance or dignity which dress could confer went for very little in his eyes; he had a superior contempt for the dandy, his estimate of men was akin to that of a nation's bard:—

"The rank is but the guinea stamp,
The man's the gowd for a' that."

James Shanks was intensely social, he delighted in entertaining numerous friends. He had acquired the art of making the gathering at his house extremely interesting; he himself was a centre of vivacity and good humour. He usually was enthusiastic over some new philosophical or scientific apparatus or contrivance. The great scope was a great delight to him. Then he frequently managed to include amongst his guests some one or two who could give special interest to the gathering—sometimes a traveller who had come home from some perilous expedition, or a philanthropist full of some scheme of beneficence. The evenings were seldom dull, and not commonplace, Shanks himself was so delightfully unaffected and free from all self-consciousness.

But his sympathies were far too broad to allow him to confine social gifts to a mere circle of private friends.

His connection with the Mechanics' Institute of his native town when he left college, and when mechanics' institutes were a novel thing, gave him a life-long interest in those institutions, and their motto truly expressed what Shanks ardently desired and ceaselessly sought to accomplish: "To make the man a better mechanic, and a mechanic a better man."

For many years he was the president of the Mechanics' Institute at St. Helens, and together with others, amongst whom may be mentioned Messrs. Watson and Wilson, of the Bridgewater Works, the brothers Lacey, who, for so many years, have done such splendid

EXPORTS OF CHEMICAL PRODUCTS

LONDON.

Week ending Mar. 1st.

Sulphate—

ne,	25 t.	£293
ne,	20 10 c.	318
urg,	200	2,301
ca,	152 14	1,875
urg,	4 2	55
urg,	128	1,470
rara,	50	500
urg,	50 15	600
urg,	60 18	725

Soda—

ania,	20 t.	£95
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Sulphur Chloride—

Orleans,	20 drs.	£19
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Meal—

rdam,	29 t. 16 c.	£150
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Products—

sh	1,199 t.	£2,000
rp,	815	1,425
ania,	55 c.	18
a,	25 t.	52
phtha	36 drs.	£37
urne,	80 c.	£202
azole	10	47
ama,	10	47
bolle Acid	11 c.	£77
us,	11 c.	181
ama,	27	£77
phthaline	103 c.	£45
York,	205	144
elphia	201	113
rt,	123	52

ic,	200 brls.	£125
on,	200 runlets. 299 cks.	273
urne,	200 kgs. 30 brls.	54
tta,	22 t.	40
,	149 drs. 5 runts. 5½ brls.	£18

Acid—

rdam,	1 c.	£8
urg,	10	76
ideo,	1 ck.	14
i,	2 t. 10 c.	375

Sulphuric Acid—

hama,	1 t. 7 c.	£181
itius,	11	77

Soda (otherwise undescrbed)

urne,	2 cs.	£25
an,	3 t.	23
tta,	5 cs.	40
land,	24 pkgs.	32
Orleans,	6 cs.	47

Sulphuric Disinfectant—

land,	10 cks.	£3
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Sulphuric of Tartar—

ane,	12 c.	£67
eton,	15 pkgs.	79
),	5 c.	26
land,	2 t. 3 c.	233

Sulphuric Soda—

eton,	1 t.	£20
Orleans,	13 3 c.	45
l,	5,040 lbs.	120

Sulphuric of Lime—

York,	1 t. 1 c.	£25
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Sulphuric Sulphate—

lona,	9 t. 18 c.	£205
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Sulphuric Fluid—

ndon,	810 drs.	£213
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Sulphuric—

aboe,	8 t. 8 c.	£26
arara,	100	1,200
eloupe,	420	4,740

Sulphuric Carbon—

els,	6 t.	£104
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Sulphuric re—

y,	15 t. 10 c.	£98
burg,	2,000 bgs.	1,800
it,	50 t.	600
a,	605 10	6,060
y,	5	70
erara,	3 8	42
erara,	15	158
ark,	100	1,200
adoes,	100	1,000
leloupe,	205	2,100
eaux,	58 12	250
urt,	60	810
ucia,	29 11	330
ras,	5	75
skov,	450 5	2,080
inique,	19 14	200

Oxalic Acid—

Auckland,	5 c.	£10
Libau,	5 t.	146
Libau,	14 cks.	145

Phosphorus—

Otago,	600 lbs.	£52
Montreal,	12 cs.	111

Superphosphate—

Rotterdam,	31 t.	£310
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Saltpetre—

Piræus,	1 t. 5 c.	£26
Boston,	16	30
Auckland,	1 5	20

Salammoniac—

Yokohama,	3 t. 14 c.	£124
Trebbonde,	4 12	140
Lisbon,	12	18

Sulphur Chloride—

Dunkirk,	6 cs.	£25
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Sheep Dip—

Punta Arenas,	1 t.	£40
Sydney,	45 pkgs.	97
Boca,	1,550 gls.	195
Natal,	500 dms.	201

Soda Ash—

Yokohama,	50 t. 1 c.	£225
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Sulphuric Acid—

Jamaica,	9½ c.	£10
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Sodium Acetate—

New York,	10 t.	£155
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Soda Crystals—

New Orleans,	11 t. 3 c.	£45
Fremantle,	3 5	10

Salammoniac—

Galatz,	1 t. 13 c.	£55
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Tartaric Acid—

Lyttleton,	3 pkgs.	£19
Sydney,	8 c.	60
Auckland,	5	40

LIVERPOOL.

Week ending Mar. 5th.

Alkali—

Syra,	30 cks.	
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Acetate of Chrome—

Vera Cruz,	2 cks.	£5
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Ammonium Muriate—

Havre,	1 t. 4 c.	£20
Melbourne,	11 3 q.	13

Ammonium Carbonate—

Valparaiso,	11 c.	£28
Hamburg,	9 1 q.	16
Odessa,	3 t. 7	111
Canada,	1 t.	30
Odessa,	11 14 c. 3 q.	509
Rouen,	3 1	88

Ammonium Sulphate—

Nantes,	50 t. 15 c.	£615
Dunkirk,	20	240
),	15	176
Hamburg,	24 5	293
Nantes,	35 5	423
Odessa,	10	120
Ghent,	30	362

Alum—

Buenos Ayres,	10 t. 2 c. 1 q.	£51
Galatz,	1	5
Santa Catherina,	1 5	7
Buenos Ayres,	5 6	26
Havana,	8 14	44
Melbourne,	1	6
Seville,	1	5

Alum Cake—

Leghorn,	16 t. 3 c.	£48
Philadelphia,	6 16	20

Bone Phosphate—

Hamburg,	16 t.	£80
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Brimstone—

Calcutta,	14 c.	£69
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Bleaching Powder—

Antwerp,	28 cks.	
Bordeaux,	13	167 tcs.
Boston,		
Chicago,		
Demerara,	4	
Dunkirk,	14	
Ghent,	131	
Hamburg,	16	
Leghorn,	24	
Montreal,	24	
New York,	471	987
Antwerp,	154	
Baltimore,	50	

Boston

Buenos Ayres,	4 cks.	92 tcs.
Corunna,	6	
Nantes,	15	
Odessa,	30 brls	
Oporto,	4	
Palermo,	7	
Philadelphia,	82	
Odessa,	9	
Oporto,	14	
Philadelphia,	168	
Stettin,	31	
Syra,	6	

Boracic Acid—

Gijon,	2 t. 9 c. 3 q.	£80
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Borax—

Rotterdam,	4 t. 19 c.	£142
Havre,	8	
Santos,	5	10
Rouen,	53 12	1,526

Blood Albumen—

Santos,	6 c.	£130
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Bone Waste—

Rouen,	4 t. 12 c.	£31
),	22 16	130

Caustic Soda—

Adelaide,	10 dms.	
Barcelona,	55 brls.	
Bilbao,	109	
Bombay,	492	10 kegs.
Carthage,	95	25 cks.
Havana,	5	
Malaga,	30	
Matanzas,	6	
Nantes,	35	
N. Orleans,	100	
New York,	30	
Odessa,	83	
Philadelphia,	135 brls.	
Rosario,	10	
Rotterdam,	10	
San Francisco,	100 dms.	
Santos,	15	
Shanghai,	8	
Smyrna,	20	
Talcahuano,	10	
Yokohama,	200	
Honolulu,	200	
Ibrail,	30	
Leghorn,	25	
Malta,	42	
Melbourne,	30	
Messina,	50	
New Orleans,	100	
New York,	940	
Odessa,	142	
Palermo,	6	
Panama,	10	
Alicante,	20	
Amsterdam,	80	
Antwerp,	8	
Barcelona,	118	
Batoum,	100	
Bilbao,	14	
Boston,	200	
Calcutta,	106	
Carril,	30	
Genoa,	40	
Ghent,	30	
Pernambuco,	30	
Rio Janeiro,	15	
Rotterdam,	45	
Seville,	380	
Vigo,	20	
Yokohama,	300	

Copper Sulphate—

Barcelona,	25 t. 2 c.	£499
Genoa,	3 10	90
Bordeaux,	14	293
Nantes,	61 17	1,375
Tarragona,	5 19	120
Trieste,	5 1	124
Bordeaux,	15 2	17
Havre,	5 3	130
Barcelona,	5 3	121
Smyrna,	1 16	44
Coruna,	1 10	37
Venice,	12 13	219
Bordeaux,	45 17	1,345
Genoa,	5	128
),	35 3 3	798
Leghorn,	15 10	340
Montreal,	14 1	225
Nantes,	10 3	250
Naples,	2 10 1	50
Rio Grande do Sul,	5	6
Accra,	1 t.	28
Barcelona,	42 3 1	996
),	10 3	223
Bari,	12 7 3	260
Bilbao,	7 2 2	125
Bordeaux,	110 3	2,610
Bombay,	3	80
Tarragona,	10	178
Trieste,	9 18	199
Venice,	47	981

Genoa,

Leghorn,	7 t. 12 c.	170
Nantes,	5 2 1	135
Nantes,	5	130
Barcelona,	15 4 3	337
Rouen,	42 15	1,112
Rio Janeiro,	4 3	5

Chemicals (otherwise undescrbed)

Gijon,	4 t. 3 c. 3 q.	£100
New York,	11	100
Hamburg,	5	540
Havre,	163 10	1,143
Rio Janeiro,	1 1	6

Caustic Potash—

Rosario,	2 c. 1 q.	£5
Genoa,	6	7
Hamburg,	5 t. 4	107
New York,	14	16

Citric Acid—

Pacasmayo,	1 c. 1 q.	£12
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Carbolic Acid—

Philadelphia,	12 c.	£132
Genoa,	3	25
Leghorn,	3 c. 3 q.	£25
Havre,	3 t. 9	162
Rotterdam,	24 5	3,390
Bombay,	20	239
Rotterdam,	18 5	2,540
Yokohama,	3 15 3	500

Charcoal—

Hamburg,	51 t.	£276
Nantes,	16	80
Hamburg,	49 17 c.	99

Dried Blood—

Rouen,	10 t. 3 c.	£81
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Disinfectants—

New York,	10 cs.	99
Montreal,	1 c.	6
Calcutta,	2 t. 5 2 q.	11

Guano—

St. John's, N. F.,	19 c. 3 q.	£5
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Gypsum Spar—

New York,	6 t. 3 c. 1 q.	£39
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Iodine—

Genoa,	10 c.	600
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Manganese Oxide—

Shanghai,	12 c.	£8
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Magnesia—

New York,	55 cs. 6 crts.	
Corunna,	2 cs.	

Magnesium Chlor

Sodium Nitrate—			
New York,	16 c.	2 q.	£22
Venice,	9 t. 17	1	85
Vera Cruz,	5	1	42
Genoa,	12	7	106
Leghorn,	7	15	66

Sodium Silicate—			
Coruna,	17 brls.		
Halifax,	25		
Gothenburg,	4		
Havre,	7		

Sodium Bicarbonate—			
Adelaide,	100 kgs.		
Barcelona,	118 dms.	100 kgs.	
Bombay,	250		
Bordeaux,	60		
Boston,	450		
Buenos Ayres,		80 cks.	
Canada,	100		
Copenhagen,	10	2	
Genoa,		30	
Hamburg,	50		
Kobe,	200 bgs.		
Lisbon,	60		
Malaga,	25		
Malta,	42 dms.		
New York,	200		
Odessa,	200		
Palermo,	20		
Stettin,	40		
Syracuse,		20	
Yokohama,	250		
Calcutta,	500		
Genoa,	70		
Kurrachee,	50		
Melbourne,	20	54	
Mexico City,	50		
Naples,	140		
New York,		7	
San Francisco,		30	
Trieste,	100		
Valencia,	100	20	
Valparaiso,	100		

Soda Crystals—			
Buenos Ayres,	500 brls.		
Gibraltar,	100		
Malta,	50		
Monte Video,	32		
New York,		280 cks.	
Smyrna,	20		
Buenos Ayres,	156		
Hamburg,	80 bgs.	8 tcs.	
New York,	747 kgs.		
Rotterdam,	10 cks.		

Soda Ash—			
Adelaide,	76 brls.		
Baltimore,	67 cks.		
Boston,	380	197 tcs.	
Canada,		258	
Chicago,	400 bgs		
Mytiene,	100 brls.		
New York,		987	
Philadelphia,	88	680	
Sierra Leone,	50 bxs.		
Bantos,	10 brls.		
Yokohama,	204		
San Sebastian,	2		
Smyrna,	109 brls.		
Adelaide,	40		
Batoum,	34		
Bayrout,	50		
Boston,		37	
B. Ayres,	300 dms.		
Carthagena,	30 brls.		
Cienfuegos,	8		
Ghent,	32		
Kingsley,		15	
Maceio,	15		
New Glasgow,		28	
New York,	102	1	
Odessa,	75	39	
Rio Janeiro,	265		
San Francisco,		217	
Santos,	5 brls.		
Sherbro,		34	
Varna,	20		
Yokohama,	100		

Salt—			
Algoa Bay,	5 t.		
Barbadoes,	17		
Bilbao,	2½		
Boston,	340		
Buenos Ayres,	25		
Cape Town,	13½		
East London,	18		
Montreal,	115		
Para,	321½		
Pernambuco,	4		
West Point,	555		
Adelaide,	9		
Alligator Pond,	9		
Antwerp,	200		
Baltimore,	500		
Barbadoes,	50		
Belize,	28		
Boca,	19		

Buenos Ayres,	30 t.		
Cameroon,	100½		
Gaboon,	17½		
Ghent,	300		
Hamburg,	100		
Manao,	26		
New Orleans,	20		
New York,		10 cs.	
Old Calabar,	59		
Opobo,	41½		
Trinidad,	63	16	
Victoria,	65		

Sulphur—			
Boston,	25 t. 1 c.	£110	
Iquique,	52 16 1 q.	337	
Cardenas,	15	5	
Sugar of Lead—			
Rio de Janeiro,	5 c.	£7	
Sodium Bichromate—			
Havre,	6 t. 18 c.	£205	
Superphosphate—			
Hamburg,	327 t.	£887	
Sodium Chlorate—			
Hamburg,	2 t.	£112	
Sodium Silicate—			
Hamburg,	1 t. 4 c.	£36	
Montreal,	1	30	
Sheep Dip—			
E. London,	16 c. 3 q.	£34	
Sheep Wash—			
Baltimore,	2 t.	£50	
Odessa,	3 8 c. 1 q.	131	
Saltpetre—			
Syracuse,	1 t. 16 c. 2 q.	£40	
Sal ammoniac—			
Amsterdam,	5 c.	£8	
Larnaca,	4 1 q.	8	
New York,	4 t. 18	160	
Genoa,	2 7	82	
Alexandria,	5	8	
Tar—			
Sierra Leone,	10 brls.		
Zinc Chloride—			
Bombay,	3 t. 10 c.	£55	
Piræus,	15	12	
Rotterdam,	5 8	36	

HULL.

Week ending March 4th.

Alum—			
Christiansand,	621 slabs		
Alkali (otherwise undescribed)			
Libau,	40 kgs. 18 cks.		
Bleaching Powder—			
Danzig,	54 cks.		
Stettin,	57		
Bone Size—			
Harlingen,	15 cks.		
Caustic Soda—			
Antwerp,	37 drms.		
Amsterdam,	50		
Konigsberg,	19		
Libau,	37		
Trieste,	10		
Chemicals (otherwise undescribed)			
Harlingen,	19 cks.		
Konigsberg,		75 pkgs.	
Libau,	1 cs.	20	
Malta,	4		
Messina,		22	
Odessa,	202	25	
Rouen,	48		
Reval,		50	
Rotterdam,	10	32	21
Stettin,		5	
Trieste,		31	
Venice,		11	
Amsterdam,	1	11	
Antwerp,	10	7	5
Bremen,		5	
Bari,		3	
Bergen,	20	1	15
Christiania,	5 2 cks.	6 pks	161 albs.
Dunkirk,	2	6 cks.	
Danzig,		21	155 pkgs.
Fiume,		6	
Ghent,		4	
Gothenburg,	10		
Hamburg,	22	3	39
Dyestuffs (otherwise undescribed)			
Hamburg,	1 drm. 2 cs.	1 ck.	
Reval,		19	
Rotterdam,		3	3 kegs
Manure—			
Aarhus,	190 t.		
Copenhagen,		350 bgs.	
Dunkirk,		99	
Ghent,		1,426	
Hamburg,		935	

Pitch—	
Antwerp,	382 t.
Cette,	1,095
Tar—	
Christiania,	20 cks.
Odessa,	1,220
Rotterdam,	6

TYNE.

Week ending Mar. 6th.

Alumina Sulphate—	
Rouen,	4 t. 19 c.
Arsenic—	
Genoa,	13 c.
Venice,	30 t. 3
Copenhagen,	1
Alkali—	
San Francisco,	40 t. 18 c.
Rotterdam,	1 13
Gothenburg,	2 16
Ammonium Sulphate—	
Valencia,	15 t. 2 c.
Bleaching Powder—	
Lisbon,	10 t. 1 c.
Antwerp,	106 8
Hamburg,	60
Baltimore,	49 17
Lisbon,	11 6
Rotterdam,	6 4
Rouen,	20 8
Gothenburg,	5
Baryta Nitrate—	
Rouen,	5 t. 1 c.
Barytes Carbonate—	
Rouen,	50 t.
Caustic Soda—	
Baltimore,	159 t. 11 c.
San Francisco,	161 11
Christiania,	1 14
Rotterdam,	1 3
Rouen,	2 18
Antwerp,	5 9
Valencia,	10 3
Gothenburg,	50 4
Copperas—	
San Francisco,	200 brls.
Hamburg,	10 c.
Calcined Magnesia—	
Lisbon,	5 c.
Ferro Manganese—	
Bilbao,	37 t. 2 c.
Glycerine—	
Rotterdam,	6 t. 10 c.
Litharge—	
Hamburg,	4 t. 5 c.
Gothenburg,	1 19
Magnesia—	
Hamburg,	10 c.
Genoa,	1 t. 16
Valencia,	3
Rouen,	3
Magnesium Carbonate—	
Valencia,	11 c.
Potassium Chlorate—	
Antwerp,	3 t. 10 c.
Hamburg,	10
Rotterdam,	1 12
Reval,	20
Rotterdam,	6
Pitch—	
Havre,	466 t.
Antwerp,	60
Soda—	
Rotterdam,	30 t. 11 c.
Aalborg,	52 30
Odense,	10 4
Ancona,	22
Nakskov,	13 14
Malmo,	5 12
Kjerteminde,	7 16
Lisbon,	5 7
Rudkjoberg,	10 5
San Francisco,	105 t.
Gothenburg,	5 4
Superphosphate—	
Malmo,	83 t. 6 c.
Christiania,	5
Aalborg,	1 5
Esbjerg,	4 8
Valencia,	55
Soda Ash—	
Genoa,	13 t. 9 c.
Ancona,	18 3
Venice,	10 9
Rotterdam,	13
Sodium Sulphate—	
San Francisco,	25 t. 1 c.
Copenhagen,	5 t. 14

Sulphur—	
Bilbao,	2 q.
Rouen,	26 t.
Sodium Hyposulphite—	
San Francisco,	25 t.
Rouen,	2 t.
Tar—	
Hamburg,	20 t.

GLASGOW.

Week ending Mar. 6.

Benzole—	
Rotterdam,	43 puns.
Boracic Acid—	
New York,	221 c.
Carbolic Acid—	
Hong Kong,	22 c.
Caustic Soda—	
Oporto,	29½ c.
Dyestuffs—	
Extracts	
Boston,	
Guano—	
Penang,	76½ t.
Glycerine—	
Rouen,	11 t. 10½ c.
Manure—	
Penang,	25 t.
Oporto,	10
Naphtha—	
Rouen,	
Pitch—	
Bombay,	
Gijong,	726 t. 6½ c.
Christiania,	13¼ t
Bordeaux,	917
Potassium Bichromate—	
Rouen,	52 t. 10 c.
Christiania,	1 ck.
Rotterdam,	145
Hong Kong,	5 t.
Boston,	72½ c.
Paraffin Wax—	
Oporto,	41½ c.
Malta,	5 t. 8½ c.
Nantes,	2,204 lbs.
Rouen,	7 t.
Christiania,	24½ c.
Hong Kong,	71½
Sodium Bichromate—	
Rouen,	9 t. 13¼ c.
Sodium Silicate—	
Penang,	1 t. 12½ c.
	27½
Salt—	
Brisbane,	100 t.
Sulphuric Acid—	
Bombay,	
Tar—	
Bombay,	23½ t.
Ultramarine—	
Mauritius,	1 t. 3½ c.

GOOLE.

Week ending Feb. 26

Benzole—	
Ghent,	17 drs.
Hamburg,	50 cks.
Rotterdam,	20
Bleaching Preparations	
Hamburg,	56 cks.
Copper Precipitate—	
Rotterdam,	233 cks.
Dyestuffs (otherwise und.)	
Ghent,	1 cs. 3 cks.
Chemicals (otherwise und.)	
Antwerp,	2 cks.
Boulogne,	6
Rotterdam,	2
Manure—	
Bruges,	232 bgs.
Ghent,	1,267
Hamburg,	439
Pitch—	
Antwerp,	90 t.

GRIMSBY.

Week ending Mar. 6.

Chemicals (otherwise und.)	
Dieppe,	121 pkgs.
Hamburg,	1 16 cks.

lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; best ground, £6.; and selected crystal ground, £8. Sulphur; best lump, 35s. 6d.; good medium, 30s.; medium, to 27s. 6d.; common, 18s. 6d. to 20s.; ground, G.G.B. brand, 65s.; common, 45s.; grey, 32s. Pumicestone quiet; ground at £10., and specially lump, finest quality, £13. Iron ore continues in demand at full prices. Bilbao and Santander stronger at 9s. to 10s. 6d.; Irish, 11s. to 12s. 6d.; Cumberland in strong demand, 24s. to 25s. Purple ore unchanged at last quotations. Spanish iron ore in demand at full prices. Emery-stone: Best brands spot and for forward delivery, bringing full prices. No. 1 lump at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth, 5s. to 50s. for best blue and yellow; fine impalpable ground, £7. wolfram, tungstate of soda, and tungsten metal more in demand. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Iron: High grades continue to be inquired for; low qualities of sale. Antimony ore and metal have further advanced. Oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown, £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. to selected lump, £16. to £17. Calamine: Best qualities scarce—80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old brand in demand, and brings full prices; 50s. for ground Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore 2s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon last quotations; Italian and Bohemian, £4. to £12. per ton; £5. to £6.; Blackwell's "Mineraline," £10. French cargoes, continues scarce on spot—20s. to 22s. 6d. Manganese strong at advanced figures. Ground mica, £50. per ton freely offering—common, 18s. 6d.; good medium, to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

Colours.—Whilst there is more doing prices are unaltered. Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 18s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s. Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 7s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; iron, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £22. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto others, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, quality, £10. to £15. Paris white, 60s. Emerald green, 10d. Derbyshire red 60s. Vermillionette, 5d. to 7d. per lb.

THE TYNE CHEMICAL REPORT.

TUESDAY.

Chemical market here has been very excited for the last few months in consequence of the miners' strike affecting the coal of the Lancashire chemical manufacturers, and partly owing to the dock labourers at Liverpool, which has caused a good deal of business to come to the Tyne which would otherwise have gone to Liverpool. Caustic soda has advanced about 30s. per ton; bleach, 15s. soda ash about 10s. a ton; and soda crystals, which were dropping, have recovered and improved about 2s. 6d. a ton in the week. Sulphate of soda continues very firm at same price week. Large American orders have come to hand for caustic, bleach and crystals. Prices are very irregular, but they may be taken as to-day's market quotations for prompt

immediate shipment to the United States higher prices are

Caustic soda, 77%, £12. per ton; bleaching powder, in softwood 5s. per ton; in hardwood casks, £6. 2s. 6d.; soda ash 48—52% per degree less 5%; soda crystals, 48s. 6d. per ton; sulphate ground, in casks, 42s. 6d. per ton, in bulk, 32s. 6d. per ton; covered sulphur £4. 5s. per ton; chlorate of potash 5d. hyposulphite of soda, in 5—7 cwt. casks, £4. 5s. per ton; in eggs, £4. 15s. per ton; silicate of soda, 140° Tw., £4. per ton; 75° Tw., £3. 7s. 6d. per ton; 75° Tw., £2. 10s. per ton; sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s.; chloride of barium, £8. per ton; nitrate of baryta, crystals 5s.; ground, £19. per ton; sulphide of barium, £5. 10s.—Tyne or f.o.r. makers' works.

Prices of manufacturing coals have not undergone any material change should the strike in the Midlands continue, prices may be taken to advance. Durham small is quoted about 10s. per ton, and Berland steam small 8s. 6d. a ton.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

In the paraffin section there is an increased weakness to note as regards burning oil, which, nominally upheld by makers' minimum prices, is in reality very much of a drug on the magazines at the works, and in the hands of dealers who have been unfortunate enough to get into stock. American petroleum quotations have been unusually low, and that has reacted with damaging force on the Scotch article; but other influences have also been operating in the same adverse direction. Paraffin manufacturers are partly compensated by the increasing stability of scale and wax on the market, which are scarce and fetching values a good fraction in excess of the downward stop prices of the association. Lubricating oils also continue firm. There is perhaps a slight improvement to mark in the general chemicals market, although backwardness is still the feature in most lines. Bleach prices are slightly higher, but there is really little doing, and the article is unsettled to a degree. Caustic quotations rise steadily under prospects of a partial fuel famine, but dealers anticipate that at least a temporary level will be reached at an early date. Chlorate of potash is slightly better, but bichromates are all idle. Sulphate of ammonia remains but little changed. Chief prices current are:—Soda crystals, 46s. 6d. net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 5% Tyne; caustic soda, white, 76°, £11. 10s.; 70/72°, £9. 15s., 60/62° £9., and 60/62° cream, £8. 2s. 6d., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 15s., and 1 cwt. casks, £6. net Tyne; refined alkali 48/52°, 1¼d., less 2½% Tyne; saltcake, 30s. to 32s. 6d.; bleaching powder, £5. 10s. to £5. 15s. less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 5d., less 5% any port; nitrate of soda 8s. 1½d. to 8s. 6d.; sulphate of ammonia, spot, £11. 15s. f.o.b. Leith; sal ammoniac 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25. 10s. less 5% Liverpool; paraffin scale, hard and soft, 2¼d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8½d.; paraffin oil (burning), 6¾d. to 7d. per gallon at Glasgow; ditto (lubricating), 86½, £5. 10s. to £6. per ton; 88½, £6. 10s.; and 890/895°, £7. 10s. to £8. Last week's imports of sugar at Greenock were 3,574 bags.

TAR AND AMMONIA PRODUCTS.

The benzol market has shown increasing signs of weakness, 90s. benzol not being worth more than 3s. 4d., and 50/90s. 2s. 6d. to 2s. 6½d. Solvent naphtha still continues to be well enquired for, and the same may be said of cresote; while crude carbolic acid is still under a cloud, and B quality of anthracene has fallen to 1s. 1d. per unit. The pitch market is exceedingly weak, and while 31s. f.o.b. has been paid in the Thames and Humber, 29s. is the price at Garston. The outlook is not assuring, but perhaps the finer weather and the long evenings may in the long-run help to re-establish prices.

The sulphate of ammonia market is practically without change, £11. 17s. 6d. down to £11. 16s. 3d. having been obtained f.o.b. Hull, the same prices ruling for London and Leith. At Liverpool the dock strike has prevented business, and quotations are therefore only nominal, as most of the business has been done from other ports.

MISCELLANEOUS CHEMICAL MARKET.

Prices of all products of the alkali trade have been very irregular during the past week. Several of the works in Lancashire have had to suspend operations owing to the short supply of fuel, and others will be in the same position during the coming week if the coal strike is prolonged. Caustic soda has been scarce and difficult to obtain, and 70's have realised £11. 10s. f.o.b.; 60's, £10. 10s., and other strengths are advanced in equal degree. Owing to the same causes, soda ash at 1½ per deg. for ordinary kinds; saltcake at 35s. per ton; and soda crystals at £3. per ton, have been eagerly taken up by those who have been compelled to place orders. Bleaching powder has also benefited by the general rush to place orders, and is at £5. 10s. on rails for softwood and £6. f.o.b. in hardwood casks. Chlorate of potash remains steady at 5d. per lb. Vitriol, muriatic acid, and sulphur are without change meantime. Sulphate of copper still active, spot price being £26. per ton, and forward deliveries £23. to £24. 10s. Manganese ore still scarce and realised 1s. 4½d. to 1s. 6d. per unit. Lead acetate is firmer, and foreign makers are quoting higher prices—white at £24. and brown £18. 10s. per ton c.i.f. Nitrate of lead quiet at £22. The demand for lead salts is still, however, below the average. Litharge of fine qualities, £15. 15s. to £16. net at usual points of delivery. Acetates of lime are still firm, but only moderate amount of business passing at last week's quotations. Arsenic firm and

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates :—

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Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid, are charged at the Tariff rates, which will be forwarded on application.

FACTORY SMOKE.

DURING the past week or two, several correspondent the Manchester papers have exercised their thought in endeavouring to persuade the public that b smoke is preventable, and that efforts should be made to sure its total abolition. Dr. Patterson, from Oldham, op the ball by suggesting the formation of an association prosecute the offenders. Mr. Fred Scott, the secretary of Manchester and Salford Sanitary Association, followed pointing out that his association had been working at the ject for some considerable time, and that, therefore, all ef towards Smoke Abolition should be centred in that Assc tion. These two letters led to another, by "Engineer," pointed out the possibility of preventing factory smoke, writing of an exhibition test, where 10 to 11 lbs. of water evaporated per lb. of fuel by one of the well-known mechar stoking appliances. The correspondence having reac this length, Mr. A. E. Fletcher, the chief inspe of alkali works for the Government, entered the l and adduced reasons why something should be done tow the solution of the problem. Another letter signed "Cle ness," and still another by Mr. J. W. Holden, conclude that has been said within the past few weeks, and it is ceedingly strange that all these correspondents have negle an enumeration of the evils arising from the combustio the sulphur of the coal. Why they should have so negle the sulphurous acid, which is the real damage-doing gredient, it is hard to conceive, but until this ev thoroughly appreciated by our legislators, as well as public, we are afraid the smoke problem will remain solved. It will be of but little use to the general publi see the carbon of the smoke totally consumed, and the still laden with those sulphurous vapours which destroy time, almost anything with which they come in contact. correspondent suggests that moderate fines have done good, and by this we presume he would go in for a whole slaughter with heavy fines, and a daily penalty so long the smoke continued. Nothing could be more errone than the belief that such method would lead to good res There are so many smoke producers in the country that one with any sense would dare to tackle them all at one ti and any wholesale system of fining would certainly defea own object in the long run.

There is no doubt but that as the consumption of increases, so will the devastation produced from coal sm also increase, and this may be seen plainly enough in suburbs of all our large towns. Even within the past two years this is only too patent around Manchester, and have also heard our friends make the same remarks regard to London, Birmingham, Leeds, Nottingham, Leicester. None of the correspondents we have alre quoted as writing to the Manchester papers have even hi what they would have us do with the sulphurous acid of coal smoke. We remember some time ago having our at tion called to an invention for washing coal smoke with l by means of which the sulphurous acid was extracted ;

IMPORTS OF CHEMICAL PRODUCTS AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

ending Mar. 11th.

Ore—

5 t. C. J. Fox & Co.
Pillow, Jones, & Co.

H. Rogers, Sons, & Co.

25 pkgs. A. & M.
Zimmermann
Arnati & Harrison

oxide—

40 Petri Bros.

80 t. C. C. Bryden & Co.

76 Gonne, Croft, & Co.

10 G. Davis & Co.

2½

F. Parbury & Co.

17 c. G. Boor & Co.

2 F. Smith

J. Kitchen

B. Jacob & Sons

Johnson & Hooper

W. C. Bacon & Co.

25 t. Flack, Chandler, & Co.

2½

100 Brandram, Bros. & Co.

10 cks. Leach & Co.

10 pkgs. Magee, Taylor, & Co.

10 cks. Leach & Co.

10 cks. Brandram, Bros. & Co.

10 cks. W. Harrison & Co.

10 cks. D. Storer & Sons

10 cks. Props. Scott's Wf.

10 cks. J. L. Lyon & Co.

199 t. Charlesworth & Co.

10 cks. Goad, Rigg, & Co.

10 cks. Redfern, Alexander, & Co.

10 cks.

26½ c. L. & I. D. Jt. Co.

37 Elkan & Co.

7½ Clarke & Smith

13 Wrightson & Son

1½ Belize Estate & Prod. Co.

21 L. & I. D. Jt. Co.

43 Forbes, Forbes, & Co.

33 Henderson Bros.

118 R. & J. Henderson

12½ Wallace Bros.

11 L. & I. D. Jt. Co.

198 W. Brandt, Sons, & Co.

20 Matheson & Co.

15 Wallace Bros.

9 L. & I. D. Jt. Co.

90 Keibel, Son, & Co.

47½ D. C. Thomas & Son

59 L. & I. D. Jt. Co.

tar—

4 pkgs. E. W. Carling & Co.

16 B. & F. Wf. Co.

5 Middleton & Co.

5 W. C. Bacon & Co.

5 J. Puddy & Co.

5 B. & F. Wf. Co.

5 W. C. Bacon & Co.

5 B. & F. Wf. Co.

8 T. Ronaldson & Co.

3—

58 t. L. & I. D. Jt. Co.

(otherwise undescribed)

60 A. & M. Zimmermann

8 T. H. Lee

20 W. Harrison & Co.

21 W. G. Jacobs

12 L. & I. D. Jt. Co.

806 A. & M. Zimmermann

69 Craven & Co.

11 Hotzapfel

50 pkgs. Bailey & Leatham

80 T. H. Lee

79 Levinstein & Sons

95 G. Meyer & Co.

Holland, 63 Burt, Boulton & Co.

Germany, 2 L. & I. D. Jt. Co.

Austria, 700 Fulwood & Bland

Canada, 40 A. J. Humphrey

Saffron

Spain, 1 pkg. C. Brumlen

Sumac

Italy, 530 pkgs. W. France & Co.

950 W. Kitchen

500 W. Shelcott

50 Larkins, Malcolmson, & Co.

Cutch

E. Indies, 500 pkgs. Wallace Bros.

1,000 Hoare, Wilson, & Co.

40 W. Isted

Capula

E. Indies, 12 pkgs. Wallace Bros.

Turmerie

E. Indies, 100 pkgs. Wallace Bros.

Gambler

E. Indies, 417 pkgs. Johnson, Ralls, & Co.

283 L. & I. D. Jt. Co.

168 P. & S. Evans & Co.

195 Elkan & Co.

1,030 E. Boustead & Co.

276 J. H. & G. Scovell

347 Beresford & Co.

845 Kleinwort, Sons, & Co.

Myrabolams

E. Indies, 2,314 pkgs. L. & I. D. Jt. Co.

90

334 D. Sassoon & Co.

667 Lewis & Peat

173 Marshall & French

2,668 Baxter & Hoare

330 L. & I. D. Jt. Co.

334

667

Tanners' Bark

Belgium, 50 t. J. Graves

U. S., 30 H. Kohnstamm

Victoria, 316 Beresford & Co.

127½

58½ Hicks, Nash, & Co.

Belgium, 12 S. Bevington & Sons

Indigo

E. Indies, 121 chts. Elkan & Co.

514 L. & I. D. Jt. Co.

54 Patry & Pasteur

16 F. H. Allen & Co.

9 Reynolds & Sellers

3 W. Brandt, Sons, & Co.

15 Philipps & Graves

22 Parsons & Keith

108 Ernsthausen & Co.

9 Stansbury & Co.

10 Benecke, Souchay, & Co.

30 J. Owen

17 Langstaff & Co.

10 cts. Gt. N. Ry. Co.

324 chts. L. & I. D. Jt. Co.

102 J. A. Payne

88 Arbuthnot, Latham, & Co.

41 Temperleys & Co.

16 Frauling & Fisher

10 Kaul & Haenlein

28 F. W. Heilgers & Co.

18 Ernsthausen & Co.

5 Hatton, Hall, & Co.

5 F. Stahlschmidt & Co.

34 Wallace Bros.

Germany, 12 F. W. Heilgers & Co.

E. Indies, 4 Elkan & Co.

5 F. Huth & Co.

4 C. J. Hambro & Son

5 T. Barlow & Bros.

20 H. Johnson & Sons

106 Ernsthausen & Co.

166 L. & I. D. Jt. Co.

19 Ralli Bros.

Indigo

E. Indies, 364 chts. L. & I. D. Jt. Co.

40

12 F. Stahlschmidt & Co.

15 Ralli Bros.

16 Patry & Pasteur

10 G. Dards

20 J. Forsey

5 J. Owen

65 Philipps & Graves

95 1 bx. Elkan & Co.

25 Sawyer, Mead, & Co.

89 pkgs. T. Ronaldson & Co.

6 bxs. Henderson Bros.

10 chts. Seton, Laing, & Co.

10 2 cs. L. & I. D. Jt. Co.

49 F. W. Heilgers & Co.

6 Oldemeyer & Hadenfeldt

29 Stansbury & Co.

115 Ralli Bros.

58 Fruhling & Goschen

24 Ernsthausen & Co.

69 Elkan & Co.

5 Kaul & Haenlein

11 Philipps & Graves

5 F. Huth & Co.

2 G. Dards

Cochineal

Canaries, 17 pkgs. Bruce & White

18 J. Goddard & Co.

Orchella

Germany, 82 pkgs. Keibel, Son, & Co.

Italy, 8 Wrightson & Son

Argols

France, 50 Skilbeck Bros.

Italy, 531 B. Jacob & Sons

200 D. Magnus

Gutta Percha—

E. Indies, 1,160 c. H. W. Jewesbury & Co.

483 Kleinwort, Sons, & Co.

250 J. H. & G. Scovell

80 G. Ward & Sons

545 H. W. Jewesbury & Co.

249 Kaltenbach & Schmitz

1,069 R. & J. Henderson

245 Kaltenbach & Schmitz

Glucose—

Germany, 110 pkgs. 110 owt. J. Barber & Co.

100 Hyde, Nash & Co.

340 520 Barrett, Tagant, & Co.

25 J. H. Epstein

U. States, 40 L. Sutro & Co.

France, 220 De Paiva, Norman, & Co.

80 Seaward Bros.

Germany, 25 140 J. H. Epstein

115 181 Prop. Chamberlain's Wf.

32 F. Stahlschmidt & Co.

U. S., 49 345 T. M. Duche & Sons

Glycerine—

Holland, 50 F. W. Heilgers & Co.

N. Zealand, 83½ J. Connell & Co.

Germany, 160 Beresford & Co.

France, 480 Spies Bros. & Co.

95 F. W. Heilgers & Co.

Germany, 125 Beresford & Co.

N. Zealand, 126 Craven & Co.

Germany, 83

Isinglass—

E. Indies, 14 pkgs. L. & I. D. Jt. Co.

14 T. H. Lee

Germany, 2 Kaltenbach & Schmitz

E. Indies, 8 Clarke & Smith

36 L. & I. D. Jt. Co.

20 Hale & Son

China, 3 W. M. Smith & Sons

E. Indies, 19 L. & I. D. Jt. Co.

Magnesia—

Holland, £250. Beresford & Co.

Magnesium—

Germany, £40. Philipps & Graves

Manure—

Phosphate Rock

France, 180 t. A. Hunter & Co.

Belgium, 350 t. Pickford & Winkfield

U. S., 170 Lawes, Manure Co.

2,732 Wylie & Gordon

Manure (otherwise undescribed)

France, 100 t. J. Burnett & Sons

U. S., 2 t. C. & A. H. Nichols

Naphtha—

Holland, 4 drs. Lister & Biggs

Belgium, 19 Stein Bros.

Potassium Sulphate—

Norway, 57 pkgs. B. & F. Wf. Co.

Petroleum—

S. Russia, 895,000 gals. Smith & Charles

U. S., 4,300 brls. J. H. Usmar & Co.

30 M. Dk. Co.

Holland, 34 drms. Burt, Boulton, & Co.

U. S., 50 brls. Barrett, Tagant, & Co.

Belgium, 140 T. Steam Tug Co.

Pearl Ash—

France, 40 c. F. W. Berk & Co.

Pyrites—

Spain, 987 t. G. Ward & So

Paraffin Wax—

U. S., 75 brls. W. H. Mitchell

75 G. H. Frank

3,659 J. H. Usmar & Co.

200 Rose, Wilson, & Rose

50 H. Hill & Sons

25 W. H. Mitchell

Pitch—

France, 70 brls. Berlandina Bros. & Co.

Plumbago—

Ceylon, 80 cks. Doulton & Co.

15 Anderson Bros.

105 Hoare, Wilson, & Co.

82 H. Lambert

3 Marshall & French

391 Thredder, Son, & Co.

15 L. & I. D. Jt. Co.

187 Prop. Chamberlain's Wf.

Holland, 124 Brown & Elmslie

Saltpetre—

Germany, 70 cks. J. Hall & Son

80 kgs. P. Hecker & Co.

E. Indies, 236 bgs. C. Wimbale & Co.

480 Clift, Nicholson, & Co.

1,223 C. Wimbale

495 C. Wimbale & Co.

Germany, 8 cks. Craven & Co.

Stearine—

Belgium, 100 bgs. H. Hill & Sons

Sugar of Lead—

Germany, 12 pkgs. W. J. Crook

14 Hernu, Peron, & Co.

Sodium Acetate—

France, £78. W. G. Blagden

Tartars—

Italy, 11 pkgs. Fellows & Co.

31 Thames S. Tug Co.

Tartaric Acid—

Bathurst,	3 cks.	Cie Francaise
Old Calabar,	2	W. Dodd & Co.
"	4	Pickering & Berthoud
Accra,	2 brls.	Davies, Robbins, & Co.
"	2	Morgan & Co.
Sierra Leone,	10	Pickering & Berthoud
"	1 keg, 4 cks.	Paterson, Zachonis, & Co.
"	4 brls.	N Waterhouse & Sons
"	17	Cie Francaise
"	67	33 cks.
New York,	4 cs.	
Para,	479	R. Singlehurst & Co
"	1	Thin & Sinclair
"	59	Bieber & Co
"	1,662	
Cameroons,	1 ck.	Rider, Son, & Co.
"	2	Lucas Bros.
"	2	J. Holt & Co.
"	2	A. Herschell
Victoria, 1 cs.	22	R. & W. King
Old Calabar,	4	E. Ost & Co.
New York,	30 bgs.	J. Holt & Co.
		C. Macintosh & Co.

Cream of Tartar—
 Barcelona, 6 hds.
 Rotterdam, 20 kegs.

Chemicals (otherwise undescribed)
 Dunkirk, 20 cks.
 Antwerp, 3 3 cs.

Dyestuffs—

Cochineal
 Teneriffe, 2 bgs. Beriro & Co.
Sumac
 Barcelona, 100 bgs. A. Ruffer & Sons
Gambier
 Singapore, 432 bls. E. Bonstead & Co.
 581 395 bgs.

Argols

Oporto, 22 cks. German Bark of London

Indigo

Calcutta, 275 chts.

Annatto

Bordeaux, 13 cks.

Myrabolams

Bombay, 2,013 bgs.
 866 Ralli Bros.
 4,703 D. Sassoon & Co.
 496 Beytes, Craig, & Co.

Extracts

Boston, 10 brls.
 Havre, 27 cks. Cunard S. S. Co.
 Rouen, 290 Co-op. W'sale Socy., Ltd.
 100 "

Valonia

Smyrna, 350 bgs. S. Vivante & Son
Orchella
 Lisbon, 22 bgs. Leeds & Liverpool Canal Co.

Dyestuffs (otherwise undescribed)

New York, 9 cs. Snow Hill E. Co.
Dried Blood
 Monte Video, 109 sks. J. Burdan

Glucose

New York, 90 brls.
 Philadelphia, 98
 Hamburg, 15 cks. 220 bgs.

Glycerine

Rotterdam, 14 dms.
 3 crbys. 5 cs.

Isinglass

Para, 17 cs. Bieber & Co.
 14 Firth, Sands & Co.
 Maranham, 4 pkgs. H. Rogers, Sons & Co.

Manganese Ore

Oporto, 200 t. 5 brls.
Oxalic Acid
 Dunkirk, 4 cks.

Paraffin Wax

Rangoon, 488 bxs.
Potassium Bromide
 New York, 20 cs.

Potash

Rouen, 90 cks. 21 dms. Co-op. W'sale Society, Limited
 Dunkirk, 20 cks.
 Rouen, 16
 Portland, 25 brls. Makin & Bancroft

Phosphate

Ghent, 450 t. The Phosphate Guano Co.
Pitch
 Rotterdam, 21 cks.
 " 44

Pyrites—

Huelva, 934 t. Tennants & Co.
 1,494 "

Sodium Nitrate

Rotterdam, 5 cks.
 Caleta Buena, 10,413 bgs.
Sugar of Lead
 Rouen, 38 cks. R. J. Francis & Co.

Sulphur Ore

Huelva, 1,121 t. Matheson & Co.
 1,362 "

Soda

Hamburg, 17 cks.
Saltpetre
 Calcutta, 1,069 bgs.

Stearine

Philadelphia, 25 hds.
Sodium Aluminate
 Hamburg, 1 ck.

Tartar

Bordeaux, 10 cks.
 Havre, 7 Cunard S.S. Co.
Tartar Emetic
 Hamburg, 4 cks.

Tartaric Acid

Rotterdam, 33 cks.
Ultramarine
 Rotterdam, 40 brls. 16 cks. 5 cs. 20

Verdigris

Bordeaux, 2 cks.
Waste Salt
 Hamburg, 102 bgs.

Zinc Oxide

Rotterdam, 100 cks. O. & H. Mar-
 Antwerp, 50 brls. cur

Zinc Ashes

Rotterdam, 17 cks.
 Boston, 22 brls.
 Hamburg, 98 bgs.

HULL.

Week ending March 13th.

Acetic Acid

Rotterdam, 17 galls. Hutchinson & Son

Acid (otherwise undescribed)

Bremen, 1 ck. Hill & Co.
 Rotterdam, 2 Hutchinson & Son

Alumina

Rotterdam, 42 cks. W. & C. L. Ringrose

Barytes

Rotterdam, 11 cks.
 Bremen, 23 Tudor & Sons
 10

Chemicals (otherwise undescribed)

Dunkirk, 90 pkgs. Wilson, Sons & Co.
 Antwerp, 100 bgs. 103 pkgs. "

Caoutchouc

Bari, 37 cks. "

Dyestuffs

Siomemunde, 4 "

Alizarine

Rotterdam, 7 pkgs. W. & C. L. Ringrose
 67 cks. Hutchinson & Son

Extracts

Trieste, 39 brls. "

Flume

Rouen, 450 "

Bordeaux

Dunkirk, 50 38 bls. Wilson, Sons & Co.

Madder

Rotterdam, 3 cks. J. Pyefinch & Co.

Valonia

Smyrna, 332 bgs. 55 tns.

Sumac

Trieste, 72 bgs. Wilson, Sons & Co.

Palermo

800 "

Glucose

Hamburg, 30 cks. Wilson, Sons & Co.

New York

15 Woodhouse & Co.
 100 bgs.
 180 brls. Wilson, Sons & Co.

Stettin

34 cks. 180 bgs. Wilson, Sons & Co.
 1,200 C. M. Lofthouse & Co.

Dunkirk

100 bgs. Wilson, Sons & Co.

Glycerine

Hamburg, 1 drum.

Naphthol

Rotterdam, 5 brls. Wilson, Sons & Co.

Pitch

Antwerp, 10 cks. Wilson, Sons & Co.

Phosphorus

Hamburg, 24 cs.

Phosphate

Dunkirk, 200 bgs. Wilson, Sons & Co.

Ghent

260 t. "

Dunkirk

1,500 bgs. "

Pyrites

Huelva, 1,445 t. J. Dalton, Holmes & Co.

Soda

Rotterdam, 8 cks. Hutchinson & Son

Sodium Nitrate

Iquique, 5,674 bgs.

Saltpetre

Hamburg, 22 brls.

Sulphur

Catania, 1,494 pkgs. Wilson, Sons & Co.

Tartar

Bordeaux, 5 cks. Rawson & Robinson

Tartaric Acid

Rotterdam, 4 cks. G. Lawson & Sons

Tar

Danzig, 57 cks. Wilson, Sons & Co.

Dunkirk

3 cs. "

TYNE.

Week ending Mar. 13th.

Barytes

Rotterdam, 46 cks. Tyne S. S. Co.

Copper Precipitate

Huelva, 6,958 bgs. Scott Bros.

Glucose

Hamburg, 9 cks. Tyne S. S. Co.

Manganese Ore

Batoum, 650 t.

Phosphate of Lime

Antwerp, 600 t. 2,000 bgs. Langdale's Manure Co.

Petroleum

Hamburg, 49 brls. Tyne S. S. Co.

Saltpetre

Hamburg, 10 kgs. Tyne S. S. Co.

Sulphur Ore

Drontheim, 470 t. R. S. Story & Co.
 Pomaron, 950 Mason & Barry

Tartaric Acid

Rotterdam, 2 cks.

Zinc Oxide

Antwerp, 25 brls. Tyne S. S. Co.

GLASGOW.

Week ending March 13th.

Aluminium

Antwerp, 2 cs.

Alum

Rotterdam, 7 cks. J. Rankine & Son

Barytes

Bremerhaven, 20 cks.
 Rotterdam, 71 bgs. J. Rankine & Son

Copper Ore

Huelva, 1,960 t. Th
 1,723 "

Chrome Ore

Macri, 1,941 t.

Dyestuffs

Alizarine
 Rotterdam, 58 cks.
 36

Extracts

Rouen, 9 cks.
 Antwerp, 8
 Belize, 465 t. McArthur, Sec
 Rotterdam, 3 cks. J. Ranki

Glucose

Philadelphia, 120 brls.
 New York, 150
 Rotterdam, 16 cks. J. Ranki

Plumbago

Leghorn, 10 bgs.

Phosphate

Antwerp, 100 t.

Pitch

9 cks.

Soda

Antwerp, 19 cks.

Saltpetre

Rotterdam, 7 cks. J. Ranki

Tartar

Oporto, 6 cks. J. & P. H.

Tartaric Acid

Rotterdam, 1 ck. J. Ranki

Ultramarine

Rotterdam, 5 cs.

Waste Salt

Hamburg, 400 t.

Zinc Ashes

Antwerp, 8 cks.

Zinc Oxide

Antwerp, 50 cks.
 75

GRIMSBY

Week ending Mar. 8.

Albumen

Dieppe, 15 pkgs.

Caoutchouc

Hamburg, 5 cs.

Chemicals (otherwise unde

Antwerp, 4 pkgs.

Glucose

Hamburg, 26 cs.
 15

Zinc Ashes

Antwerp, 16 cks.

GOOLE.

Week ending March 5

Alumina Sulphate

Antwerp, 40 brls.

Caoutchouc

Boulogne, 8 cks.

Dyestuffs

Alizarine
 Rotterdam, 39 cks.

Extracts

Rotterdam, 2 cks.

Dyestuffs (otherwise unde

Boulogne, 28 cks. 24 cs.

Glycerine

Hamburg, 3 cs. 2 cyb

Glucose

Hamburg, 40 bgs.
 Dunkirk, 220

Naphthol

Rotterdam, 5 cks.

Phosphate

Ghent, 800 bgs.

Potash

Dunkirk, 16 cks.
 Calais, 22

Plumbago

Boulogne, 3 cks.

Saltpetre

Rotterdam, 325 bgs.
 Antwerp, 100

Potassium Muriate

Rotterdam, 11 cks.

Sugar of Lead

Hamburg, 33 cks.

Waste Salt

Hamburg, 55 cks.

EXPORTS OF CHEMICAL PRODUCTS

LONDON.

Week ending March 8th.

Acid—

me, 6 cks. £21

ury, 15 cs. 27

Sulphate—

d, 80 t. 2 c. £1,225

rg, 2,296 1,361

ra, 25 250

s, 100 18 1,160

rg, 50 14 605

k, 20 8 245

rg, 36 6 425

rg, 20 200

ura, 23 3 234

rg, 50 14 605

s, 10 5 120

Sulphate—

s, 1 t. 2 c. £29

Sulphate—

ake—

a, 27 t. 10 c. £100

Sulphate—

uma, 3 t. £112

otherwise undescribed

100 cs. £250

l, 5 c. 42

Sulphate—

me, 5 t. £79

Sulphate—

c Acid—

rg, 2 c. £33

Sulphate—

ash—

lles, 10 t. 13 c. £190

Sulphate—

roducts—

htha

urne, 15 drs. £15

ls, 2 2

urne, 63 146

Sulphate—

sole

s, 19 pns. £375

urg, 10 cks. 206

dam, 30 437

ralla, 4 drs. 109

dam, 25 19 cks 905

urg, 20 343

Sulphate—

rk, 140 t. £215

rk, 371 bulk. 406

s, 225 80 brls. 631

s, 1,093 50 383

y, 51 1,913

bulk. 16

idria, 120 22

s, 250 1,669

s, 100 runlets £150

so, 60 61

ii, 100 36

y, 200 52

ii, 200 110

s, 4 cks. 53

te, 30 drs. 3

id, 15 brls. 8

100 runlets 20

10 cks. 55

50 drs. 14

ancisco, 500 31

Kong, 20 cks. 15

y, 68 runlets 57

Sulphate—

idine Bases

rg, 12 cks. £17

ral Naphtha

me, 25 drms. £17

Sulphate—

note

ux, 2,200 brls. £1,320

oic Acid

rg, 5 cks. £32

racene

lorf, 210 c. £348

e, 200 340

lorf, 480 cks. 3,303

lam, 565 3,906

63 340

ithaline

a, 2 c. £19

ork, 201 95

lam, 10 cks. 10

ill

les, 100 brls. £75

oic Acid Crystals

les, 120 cks. 1,680

ork, 10 cs. 65

c Solid—

ma, 2,000 lbs. £123

c Acid—

am, 49 cks. £285

lay, 20 drms. 18

ma, 2,000 lbs. 144

Caustic Soda—

Oporto, 4 t. £40

Auckland, 10 87

Brisbane, 5 12 c. 48

Cream of Tartar—

Wellington, 1 t. 3 c. £120

Auckland, 1 105

Dunedin, 15 100

Auckland, 1 105

Melbourne, 5 cs. 31

Adelaide, 15 84

Chemicals (otherwise undescribed)

Amsterdam, 4 c. £40

Barcelona, 7 cs. 95

Dunedin, 26 pkgs. 55

Callao, 10 16

New York, 14 40

New York, 7 t. 17 c. 800

New York, 10 cs. 140

Copper Sulphate—

Treport, 7 t. 2 c. £173

Venice, 100 cks. 634

Trieste, 20 127

Genoa, 5 5 c. 135

Venice, 61 14 1,792

Trieste, 21 16 553

Treport, 5 1 128

Citric Acid—

Libau, 20 cks. £677

Sydney, 5 c. 40

Baltimore, 1 t. 5 185

Oporto, 3 cks. 22

Genoa, 25 187

Paris, 1 c. 7

Hamburg, 3 kegs 22

Marseilles, 121 t. 4 c. 559

Adelaide, 14 lbs. 1

Cologne, 5 c. 35

New York, 2 t. 265

Santander, 6 1/2 c. 39

Disinfectants—

Madras, 21 c. £30

Melbourne, 2 t. 10 c. 40

Paris, 368 gls. 30

Halifax, 1 ck. 10

Dried Blood—

Oporto, 6 t. 3 c. £50

Fluoric Acid—

Melbourne, 540 gls. £33

Guano—

Trinidad, 80 t. 2 c. £841

Demerara, 75 t. 750

St. Kitts, 25 250

Hydrochloric Acid—

Rosario, 10 cs. £11

Hard Water Crystals—

Halifax, 2 cs. £22

Insect Powder—

Pt. Natal, 6 c. £52

Manure—

Fertilizers

Brisbane, 20 t. £270

New York, 3 45

Stettin, 220 2 c. 940

Gandia, 641 11 5,457

Hamburg, 320 1,245

Gothenburg, 322 12 1,308

Rotterdam, 9 15 88

St. Lucia, 29 6 220

Antigua, 25 250

Rotterdam, 15 135

Demerara, 52 250

Rotterdam, 121 4 559

Dunkirk, 15 24

Singapore, 14 60

Cologne, 39 7 185

Stettin, 49 6 214

Bordeaux, 25 100

Rouen, 122 10 600

Demerara, 80 516

540 bgs. 800

Oxalic Acid—

Antwerp, 5 t. 11 c. £200

Melbourne, 6 10

Potassium Chlorate—

Philadelphia, 1 t. 5 c. £60

Picric Acid—

Melbourne, 1 cs. £12

Superphosphate—

Rotterdam, 31 t. 14 c. £160

Saltpetre—

Rio Janeiro, 2 t. 10 c. £56

Porto Alegre, 17 21

Rio Janeiro, 1 11 35

Sulphur Flowers—

Algoa Bay, 2 t. 5 c. £27

Lisbon, 250 brls. 193

Sodium Sulphate—

Ghent, 40 t. £40

Sulphuric Acid—

Port Natal, 60 cs. £75

Trinidad, 1 pkg. 10

Rosario, 10 cs. 132

Karachi, 100 drs. 132

Sodium Silicate—

Yokohama, 6 t. 18 c. £29

Sheep Dip Powder—

Algoa Bay, 80 cs. £98

M. Video, 110 drs. 75

Algoa Bay, 305 875

E. London, 150 725

Algoa Bay, 1 t. 42

Sydney, 49 gls. 12

Sulphur—

E. London, 160 cks. £141

Calcutta, 7 t. 19 c. 38

Soda Crystals—

Yokohama, 5 t. 11 c. £23

Gibraltar, 10 30

Sodium Bicarbonate—

Auckland, 2 t. £87

Sodium Acetate—

Melbourne, 2 cks. £17

Superphosphate—

Penang, 2 t. £12

Cherbourg, 185 555

Salammoniac—

Smyrna, 11 c. £21

Salonica, 1 t. 16 c. 60

Tartaric Acid—

Wellington, 5 c. £33

Auckland, 5 34

Dunedin, 7 58

Hamburg, 10 6

LIVERPOOL

Week ending Mar. 12th.

Antimony—

Madras, 6 c. £21

Alum Cake—

Calcutta, 12 t. 12 c. £54

Alum—

Galatz, 5 t. 5 c. 3 q. £20

Oporto, 5 14 1 28

Halifax, 2 12 13

Smyrna, 2 4 1 13

Galatz, 7 11 39

Bombay, 8 3 42

Piræus, 4 10 22

Talcabuan, 1 5

Rio de Janeiro, 4 12

Ammonium Sulphate—

Antwerp, 1 t. 10 c. £18

Hamburg, 79 948

Bordeaux, 25 300

Demerara, 15 11 202

Hamburg, 110 9 2 q. 1,497

Las Palmas, 5 2 1,030

Hamburg, 29 7 61

Bordeaux, 20 7 336

Ammonium Carbonate—

Ancona, 5 c. 2 q. £17

Rotterdam, 2 t. 5 84

Genoa, 1 10 49

Philadelphia, 10 19 2 q. 494

Leghorn, 1 33

Valparaiso, 1 5 44

Hamburg, 5 3 7

Havana, 6 9

Bleaching Powder—

Bordeaux, 27 cks. 24

Boston, 252 60

Genoa, 5 5

Odessa, 6 185

Rio Janeiro, 26 214

Rotterdam, 26 100

Rouen, 196 600

San Sebastian, 18 brls. 516

Santos, 1 800

Bilbao, 54

Boston, 192 125 pkgs.

Chicago, 29 55 tcs.

Hamburg, 29

New York, 351

Vera Cruz, 8

Boracic Acid—

New Orleans, 6 c. £11

Bisulphide of Carbon—

Maranham, 5 c. £8

Borax Salts—

Havana, 1 t. 5 c. £68

Caustic Soda—

Adelaide, 150 dms. 6

Algiers, 6

Amsterdam, 14

Ancona, 15

Bahia, 40 dms.

Bordeaux, 17

Boston, 200

Corunna, 20 brls.

Corfu, 40 2 brs.

E. London, 15

Fiume, 10 40 kgs.

Citric Acid—

Piraeus,	5 c.	£37
Carril,	4	28
Portland,	2 1 q.	16

Copperas—

Valparaiso,	7 t. 4 c. 1 q.	£16
Alexandria,	14 3 3	29

Caustic Potash—

Chicago,	4 t. 7 c.	£87
Shanghai,	1 1 q.	21

Epsom Salts—

Malaga,	14 brls.	
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Guano—

Malaga,	29 t. 17 c. 3 q.	£291
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Glycerine—

Vera Cruz,	2 drs.	£5
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Iodine—

New York,	2 t.	£1,200
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Magnesium Calcide—

Genoa,	84 lbs.	£100
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Magnesium Chloride—

Bombay,	25 t. 17 c.	£74
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Manure—

Havre,	150 t. 2 c. 3 q.	£476
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Magnesia—

Portland,	5 cs.	
Rangoon,	10 kegs.	
Rio Janeiro,	10	
Genoa,	4	
Gijon,	1	

Oxalic Acid—

San Francisco,	2 t. 11 c. 2 q.	£75
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Pitch—

Talcahuano,	6 t. 5 c.	
Bilbao,	11 t.	

Potassium Oxalate—

Madras,	5 c. 3 q.	£9
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Potassium Chlorate—

Barcelona,	1 t. 4 c.	£50
Corunna,	10	22
New York,	10	448
Trieste,	2 10	130
Yokohama,	5	210
Ancona,	6	14
Carril,	10	22
Barcelona,	4 16	185
Boston,	5	198

Phosphate—

Hamburg,	25 t. 14 c.	£130
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Potassium Carbonate—

Chicago,	5 t. 2 c.	£91
New York,	3 15	68

Phosphorus—

Bilbao,	2 c.	£32
Mexico,	18	152

Potash—

Buenos Ayres,	15 c.	£40
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Potassium Bichromate—

New York,	18 t.	£490
Havre,	10	310
Seville,	7 c. 2 q.	14

Salt—

Ambriz,	5 t.	
Cameroon,	44 3/4	
Durban,	1 3/4	
Iquique,	10 c.	
Kingston,	2	
Landana,	7	
Loanga,	15	
Manaos,	19 13	
Sydney,	300	
Vera Cruz,	12 10	
Antwerp,	304	
Belize,	222	
Benn,	22 1/2	
Bonny,	18	
Buenos Ayres,	50	
Calcutta,	3,205	
Cape Coast,	6 3/4	
Gothenburg,	7 3/4	
Halifax,	800	
Iceland,	90	
Manaos,	7 3	
Mandal,	40	
Maryborough,	35	
Melbourne,	50	
St. John's,	10	
Santos,	100 cs.	

Sodium Nitrate—

Christiana,	4 t. 1 c. 1 q.	£37
Santander,	2 2	18
Barbadoes,	10	86
Oporto,	1 6 1	11
Shanghai,	5 3	43
Valencia,	16	7

Sulphur—

Algoa Bay,	4 t. 9 c. 1 q.	£38
Pernambuco,	2 3 1	16
Iquique,	5	24
St. John's,	6	38
Madeira,	2 10	22
St. John,	15	5
Iquique,	10	50

Salammoniac—

Mersyne,	1 t. 1 q.	£35
Naples,	1 1	34
Ancona,	5 c.	9
Trieste,	1 11 3	56
Alexandria,	1	35
Odessa,	6 1 2	201
Philadelphia,	4 2	141
Piraeus,	3	5
New York,	4 19 2	167
Syria,	3 3	7
Hamburg,	5	9
Bourgas,	13	25
Genoa,	1 5 1	51

Superphosphate—

Hamburg,	69 t. 6 c. 3 q.	£100
"	227 11 3	628

Saltpetre—

Ancona,	3 t.	£60
St. Catherina,	1	22
Syria,	2 1 c. 1 q.	44
St. John,	1 10	32
St. Louis,	2	5

Saltcake—

Bari,	300 t. 1 c.	£413
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Sheep Dip—

Valparaiso,	25 drs.	£6
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Sulphuric Acid—

Santos,	19 crbys.	£25
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Sodium Biorate—

Antwerp,	5 t. 7 c. 3 q.	£161
Rotterdam,	10 2 2	116

Sodium Chlorate—

Vera Cruz,	1 ck.	£9
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Soda Ash—

Baltimore,	68 cks. 112 tcs.	
Boston,	500 bgs. 305	
Corfu,	100 dms.	
Ghent,	43 cks.	
Madeira,	2 tcs.	
Maranham,	30 brls.	
Melbourne,	302 cks.	
Naples,	33	
Sherbrooke,	17 tcs.	
Smyrna,	200 brls.	
Alicante,	30 cks.	
Ancona,	3	
Baltimore,	492 132 tcs.	
Boston,	466 1,520 bgs.	
Demerara,	40	
Madrid,	28 brls.	
Monte Video,	100	
New Orleans,	7 cks. 39 brls.	
New York,	10 960 tcs.	
Portland, M.,	67	
Rio Grande do Sul,	10 brls.	
Syria,	10	

Soda Crystals—

Alexandria,	34 brls.	
Boston,	280 cks.	
Constantinople,	50 brls.	
San Sebastian,	30	
St. John, N.B.,	200	
Rosario,	100	
Smyrna,	35	
Valencia,	8 cks.	
Malta,	50 brls.	
St. John,	100 cks.	

Sodium Bicarbonate—

Antwerp,	135 kgs.	
Hamburg,	90 6 cks.	
Rouen,	65	
Stettin,	40	
Antwerp,	10 cks.	
Brisbane,	200 kgs.	
New York,	200	

Sodium Silicate—

Barcelona,	16 cks.	
Carthagena,	6	
Havre,	4	
Leghorn,	4 brls.	
Madeira,	10 cks.	
Savanna,	5	
Seville,	35 brls.	
Venice,	32 cks.	
Odessa,	75	
Malta,	10 brls.	

Tartaric Acid—

Carril,	2 c.	£11
Portland,	17	85

Wood Acid—

Vera Cruz,	6 cs.	£16
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Zinc Muriate—

Halifax,	2 t. 8 c. 1 q.	£47
Bombay,	5 17	88

TYNE.

Week ending Mar. 13th.

Alum Cake—

Copenhagen,	12 t. 16 c.	
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Ammonium Sulphate—

Rotterdam,	20 t. 3 c.	
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Alkali—

Hamburg,	25 t. 19 c.	
Antwerp,	21 1	
Amsterdam,	37 8	
Rotterdam,	15 2	

Bleaching Powder—

Messina,	1 t. 14 c.	
Hamburg,	109 18	
Gothenburg,	5 4	
Antwerp,	48 19	
Christiana,	20 1	
Konigsberg,	8 16	
Amsterdam,	119	
Rotterdam,	49 18	
Copenhagen,	28 4	
Dunkirk,	34 18	

Caustic Soda—

Hamburg,	5 c.	
Antwerp,	150 t.	
Amsterdam,	13 14	
Valencia,	10 3	

Dyestuffs (otherwise undescribed)

Malmo,	1 q.	
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Ferro Manganese—

Bilbao,	40 t.	
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Litharge—

Hamburg,	2 t. 12 c.	
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Magnesia—

Hamburg,	11 c.	
Antwerp,	1	

Potassium Chlorate—

Hamburg,	3 t. 6 c.	
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Sodium—

Hamburg,	1 cs.	
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Soda—

Malmo,	5 t. 18 c.	
Randers,	24 10	
Aarhus,	17 5	
Rotterdam,	36 7	

Sodium Chlorate—

Hamburg,	1 t.	
Rotterdam,	1	

Sodium Bicarbonate—

Amsterdam,	2 t. 2 c.	
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Soda Salts—

Amsterdam,	5 t.	
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Soda Ash—

Christiana,	38 t. 5 c.	
Konigsberg,	85 7	

Sodium Sulphate—

Gothenburg,	6 t. 2 c.	
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Superphosphate—

Aarhus,	5 t. 4 c.	
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Tar—

Hamburg,	20 t.	
Copenhagen,	4	

HULL.

Week ending Mar. 11th.

Alkali—

Drontheim,	41 drms.	
Harlingen,	86 cks.	

Bleaching Powder—

Copenhagen,	1 ck.	
Stettin,	166	

Bone Size—

Bremen,	10 cks.	
Copenhagen,	2	
Harlingen,	10	

Caustic Soda—

Hango,	89 drms.	
Libau,	69	
Rotterdam,	37	

Chemicals (otherwise undescribed)

Amsterdam,	20 pkgs.	
Antwerp,	26 cs. 10 cks.	
Boston,	125	
Christiana,	10	
Christiansand,	10	
Copenhagen,	12	
Dunkirk,	15	
Genoa,	102 4	
Gothenburg,	31	325 slabs
Hamburg,	74	27
Libau,	37 1 12	165
Leghorn,	10 16	
Marseilles,	55 15	
Rotterdam,	1 67	
Rouen,	48	
Stettin,	4	

Dyestuffs (otherwise undescribed)

Rotterdam,	68 bgs. 4 cks.	
Reval,	3 cs.	

Manure—

Antwerp,	228 bgs.	
Drontheim,	425	
Ghent,	602	
Hamburg,	264	
Rotterdam,	171	

Naphtha—

Bergen,	2 cks.	
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Pitch—

Antwerp,	341 t.	
Dunkirk,	134	
Genoa,	208	
Leghorn,	61	

Superphosphate—

Drontheim,	1,200 bgs.	
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Zinc Muriate—

Kjoge,	190 cks.	
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GLASGOW.

Week ending Mar. 13th.

Ammonium Sulphate—

Trinidad,	69 t. 9 1/2 c.	
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Bleaching Powder—

Sydney,	10 t.
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PRICES CURRENT.

WEDNESDAY, MARCH 19, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
25 % and 40 % per cwt	7/6	&	12/9
Glacial	3	5	0
S.G., 2000°	0	12	9
c 82 % nett per lb.	0	0	6 1/2
ic (Tower Salts), 30° Tw. per bottle	0	0	8 3/4
(Cylinder), 30° Tw.	0	2	11
io° Tw. per lb.	0	0	2
.. .. .	0	0	1 1/4
.. .. . nett	0	0	3 1/4
.. .. .	0	1	4
ric (fuming 50 %) per ton	15	10	0
(monohydrate)	5	10	0
(Pyrites, 168°)	3	2	6
(" 150°)	1	8	0
(free from arsenic, 140/145°)	1	10	0
rous (solution)	2	15	0
(pure) per lb.	0	1	0 1/2
c	0	1	2 1/2
white powdered per ton	13	10	0
se lump)	4	15	0
Sulphate (pure)	5	0	0
" (medium qualities)	4	10	0
m per lb.	0	15	0
, 880=28° per lb.	0	0	3
=24°	0	0	1 1/4
Carbonate nett	0	0	3 1/2
Muriate per ton	23	10	0
" (sal-ammoniac) 1st & 2nd	37/-	&	35/-
Nitrate per ton	42	0	0
Phosphate per lb.	0	0	10 1/2
Sulphate (grey), London per ton	11	16	3
" (grey), Hull	11	17	6
il (pure) per lb.	0	0	11
alt	0	0	9 1/2
.. .. . per ton	75	0	0
(tartar emetic) per lb.	0	1	1
(golden sulphide)	0	0	10
chloride per ton	8	0	0
arbonate (native)	3	15	0
ulphate (native levigated)	45/-	to	75/-
Powder, 35 %	5	10	0
Liquor, 7 %	2	10	0
e of Carbon	13	0	0
1 Acetate (crystal) per lb.	0	0	6
Chloride per ton	2	2	6
y (at Runcorn) in bulk	17/6	to	35/-
Dyes:—			
e (artificial) 20 % per lb.	0	0	9
a	0	3	9
Products			
ene, 30 % A, f.o.b. London .. per unit per cwt.	0	1	5
90 % nominal per gallon	0	3	4
50/90	0	2	6
c Acid (crystallised 35°) per lb.	0	0	10 1/2
" (crude 60°) per gallon	0	2	10
e (ordinary)	0	0	2 1/2
(filtered for Lucigen light)	0	0	3
Naphtha 30 % @ 120° C.	0	1	5
Oils, 22° Tw. per ton	3	0	0
.o.b. Liverpool or Garston	1	9	0
Naphtha, 90 % at 160° per gallon	0	1	11
1 Oils (crude)	0	0	2 1/2
hili Bars per ton	47	7	6
lphate	26	0	0
ide (copper scales)	51	0	0
(crude)	30	0	0
(distilled S.G. 1250°)	55	0	0
.. .. . nett, per oz.	8 1/2	d.	to
hate (copperas) per ton	1	10	0
hide (antimony slag)	2	0	0
et) for cash	14	0	0
large Flake (ex ship)	15	10	0
tate (white ")	23	15	0
" (brown ")	18	10	0
bonate (white lead) pure	19	0	0
ate	22	0	0

	£	s.	d.
Lime, Acetate (brown)	8	5	0
" (grey) per ton	14	0	0
Magnesium (ribbon and wire) per oz.	0	2	3
" Chloride (ex ship) per ton	2	6	3
" Carbonate per cwt.	1	17	6
" Hydrate	0	10	0
" Sulphate (Epsom Salts) per ton	3	0	0
Manganese, Sulphate	18	0	0
" Borate (1st and 2nd) per cwt.	60/-	&	42/6
" Ore, 70 % per ton	4	10	0
Methylated Spirit, 61° O.P. per gallon	0	2	2
Naphtha (Wood), Solvent	0	3	11
" Miscible, 60° O.P.	0	4	9
Oils:—			
Cotton-seed per ton	22	10	0
Linseed	23	0	0
Lubricating, Scotch, 890°—895°	7	5	0
Petroleum, Russian per gallon	0	0	5 1/4
" American	0	0	5 1/4
Potassium (metal) per oz.	0	3	10
" Bichromate per lb.	0	0	4
" Carbonate, 90% (ex ship) per ton	18	0	0
" Chlorate per lb.	0	0	5
" Cyanide, 98%	0	2	0
" Hydrate (Caustic Potash) 80/85 % per ton	22	10	0
" (Caustic Potash) 75/80 %	21	10	0
" (Caustic Potash) 70/75 %	20	15	0
" Nitrate (refined) per cwt.	1	3	6
" Permanganate	4	5	0
" Prussiate Yellow per lb.	0	0	9 1/2
" Sulphate, 90 % per ton	9	10	0
" Muriate, 80 %	7	15	0
Silver (metal) per oz.	0	3	7 1/2
" Nitrate	0	2	5 1/2
Sodium (metal) per lb.	0	4	0
" Carb. (refined Soda-ash) 48 % per ton	6	5	0
" (Caustic Soda-ash) 48 %	5	10	0
" (Carb. Soda-ash) 48 %	5	12	6
" (Carb. Soda-ash) 58 %	6	15	0
" (Soda Crystals)	3	0	0
" Acetate (ex-ship)	15	15	0
" Arseniate, 45 %	10	10	0
" Chlorate per lb.	0	0	6 1/4
" Borate (Borax) nett, per ton	30	0	0
" Bichromate per lb.	0	0	3
" Hydrate (77 % Caustic Soda) per ton	13	0	0
" (74 % Caustic Soda)	12	10	0
" (70 % Caustic Soda)	11	10	0
" (60 % Caustic Soda, white)	10	10	0
" (60 % Caustic Soda, cream)	10	0	0
" Bicarbonate	6	0	0
" Hyposulphite	5	5	0
" Manganate, 25%	9	0	0
" Nitrate (95 %) ex-ship Liverpool per cwt.	0	8	1 1/2
" Nitrite, 98 % per ton	27	10	0
" Phosphate	15	15	0
" Prussiate per lb.	0	0	7 1/4
" Silicate (glass) per ton	5	7	6
" (liquid, 100° Tw.)	3	17	6
" Stannate, 40 % per cwt.	2	0	0
" Sulphate (Salt-cake) per ton	1	15	0
" (Glauber's Salts)	1	10	0
" Sulphide	7	15	0
" Sulphite	5	5	0
Strontium Hydrate, 98 %	8	0	0
Sulphocyanide Ammonium, 95 % per lb.	0	0	8
" Barium, 95 %	0	0	5 1/4
" Potassium	0	0	8
Sulphur (Flowers) per ton	7	10	0
" (Roll Brimstone)	6	0	0
" Brimstone: Best Quality	4	7	6
Superphosphate of Lime (26 %)	2	10	0
Tallow	25	10	0
Tin (English Ingots)	95	0	0
" Crystals per lb.	0	0	6 1/4
Zinc (Spelter) per ton	21	15	0
" Chloride (solution, 96° Tw.	6	0	0

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Notices.

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Our Registered Telegraphic Address is—
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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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THE PATERNAL GOVERNMENT AGAIN.

TO say in one breath that "comparisons are odious" and in the next that "all things are comparative" would seem to imply either that we have risen to height of paradox, or that we have lost our love things in general. Perhaps at times we might blush each of the soft impeachments, but at the present moment we are too much concerned with something else, to blush anything. We had drifted into what we may call a comparative line of thought, after a perusal of a recent number of the *Times*. In one column was treated case of Madame Tshebrikova, and, incidentally, gigantic abuses of power, and the cruelties of the despotism, under which Russia even at the present day groaning and travailing. And here came in the "odious comparison." Verily, we thought, our land is not as that land; our rulers are not as those rulers; England bask in the sunshine of justice, while Russia simply writhes under the administration of the law. And going on in this congratulatory strain, we had almost succeeded in convincing ourselves that we dwelt in the midst of perfection and that the Utopia of Sir Thomas More's aspirations was no longer a myth but a reality. And then, our eyes wandering over the pages before us, fell on the word "gold" and that word (we admit it shamelessly), rivetted attention immediately. It was not entirely unknown to us. We were acquainted with the chemical symbol of the substantive to which it referred, and had we studied some of its salient properties—and we knew, though usually classed among the fixed elements, it is most often endowed with a volatility that is simply irrepressible. We were, therefore, not surprised to find that the circumstances under which it appeared in the *Times* had referred to a difficulty in its production. Sir Pritchard Morgan, seems, after having, in company with other speculative pockets, invested almost untold wealth in the Cambrian gold mines, and after having proved the exceeding richness of deposits, has been rudely awakened from his golden dream by an unappreciative Government, which has stepped in at a vital moment with its paternal claims, and caused the suspension of operations.

We are not entirely at one with Sir Pritchard Morgan regarding all that he says about this gold mine, nor are we entirely at variance with him. He regards it as a field of labour. So do we. But we may differ somewhat in our estimate of its productiveness, for we have reliable advice that it is *not* one of the richest mines in the world, and is unlikely ever to be a second Mount Morgan in anything but name. But, be this as it may, we have profound sympathy with Sir Pritchard Morgan as a victim of red-tape interference or departmental stupidity. And this brings us back to the second of our original propositions—that "all things are comparative," for even in this land of progress, where the machinery of the State is supposed to be so highly organised it is only too painfully evident that there is a huge want of ordinary intelligence in high places, and that the business

affairs of the nation are too often conducted upon the most unsound of business principles. We hope that Sir Pritchard Morgan's letter to Lord Salisbury will procure him an early opportunity of gathering in his golden harvest, and that it may be the means of stimulating the powers that be to a more intelligent administration of the functions committed to their charge.

BRINE PUMPING IN CHESHIRE.

A NEW SCHEME.

THE inhabitants of the salt district are for once making common cause with their enemies the brine pumpers. A new pumping company has been formed which, it is believed, will seriously affect the interests of all parties in the salt district. With their houses tumbling about their ears, the people of Northwich are, of course, against an extension of operations which they believe have brought about this state of things. But there is a good deal more in the matter than this. The new company proposes to tap the Northwich brine, and take it elsewhere for manufacture. A shaft is to be sunk at Wincham, which is just outside Northwich, and the brine is to be sent in pipes to Widnes, some ten miles off, where it will be converted into salt or used in the manufacture of chemicals. Well, how would this affect the interests of the Northwich district? Take first the case of the public. Great damage has been done to property by subsidences of land due, there can be little doubt, to the pumping of brine. No compensation has been given, and the brine pumpers do not admit liability. But the district receives a kind of indirect compensation. The salt industry and the industries associated with it find employment for the bulk of the people, and the works are large contributors to the rates. Moreover, so much salt is carried down the Weaver that until lately the Weaver Trustees have been able out of surplus revenue to contribute £14,000, or £15,000, in relief of the county rates. But it is said that if the new company sends its brine to Widnes, which is in another county, the manufacturing industries will follow, and that Northwich and Winsford, robbed in a manner of their daily bread, would continue to suffer from subsidences without hope of compensation. The bill promoted by the new company makes some references to damage which may be caused by brine pumping, but these are regarded by the opponents of the scheme as "hypothetical and illusory."

As to the manufacturers' side of the case, they say that if salt and alkali are manufactured on the banks of the Mersey they will, in self-defence, have to establish works in the same locality and adopt new means of sending their brine there. It is clear that a company manufacturing salt and chemicals at Widnes would have at a disadvantage rivals who had to pay the Weaver dues; and it is also clear that if the manufacture of salt and alkali is removed to the seaside, it will put the Weaver Trustees, with their large debt, in a very serious position. The Northwich and Winsford manufacturers argue that a competition such as is contemplated, is wholly uncalled for in the public interest. In a petition against the bill they suggest that the new company is promoted exclusively in the interest of chemical manufactures at Widnes, who seek to obtain brine for use in their works at a somewhat less cost than at present is paid for common salt, and at the same time to establish a salt trade wholly foreign to the locality. It is also pointed out that Parliament has hitherto protected the inhabitants and the great industry of the district by making statutory provisions to prevent brine leaving the district, and has uniformly rejected all attempts in this direction. We do propose here to discuss the rights and wrongs of this important matter, which will shortly come before Parliament. The new company, which bears the name of the "Widnes Brine Supply Company," have lodged their bill in the House of Lords, and it will probably come before a committee about the end of next month. It will be opposed by the Local Boards of Northwich, Winsford, Middlewich, and Sandbach, by the Salt Union, and by Messrs. Brunner, Mond and Co., Limited, and other local manufacturers. Professor Boyd Dawkins made a visit to the district a day or two ago, and we understand he will be called as a witness against the Bill. We are informed that he entertains no doubt that the subsidences at Northwich are due to the pumping of brine—a theory which has long been maintained by those more conversant with the district.

CRYSTALS OF GYPSUM.—Very interesting specimens of crystals of gypsum are being found in the drift clay through which a sewer is being formed at the Gateshead end of the Redheugh Bridge. The sewer is 30 ft. deep, and crystals of gypsum, or sulphate of calcium, in the very perfect and varied rhomboidal forms, are frequently being found. Specimens from various formations may be seen in the excellent local museum.

CHEMICAL ENGINEERING.

XXIV.

TRANSPORTING GASES.

WE may follow the same course in dealing with gases as we have already done with liquids; but with gases the problem is much simpler in character, owing to the fact that gases must be entirely closed in the conduit in which they are flowing, so that if we confine ourselves to a study of this question it is nearly all we have to consider from a theoretical standpoint.

Head or pressure must be taken into our calculations in the same manner as in dealing with liquids, but if we follow the formula given by Professor Pole for the discharge of gas through pipes we must measure that head or pressure in terms of inches of water. The tables already given will enable the student to convert pounds per square inch or inches of mercury pressure into inches of water pressure, and by the aid of the following formula there need be no temptation to use the method of trial and error when settling the size of pipe necessary to accommodate a certain flow of gas. One remark, however, may be necessary, and of which the importance has forced itself upon me by experience—if a calculation for the diameter of a pipe, works out to an inch and fractions, it is safer, especially if the pipe is not completely straight, to take the required size as the next even inch, to allow for friction—thus, if the calculation said 3.72 inches, we should infer a 4.0 inch pipe to be necessary.

And here, again, may be noticed that a very considerable difference in practical effect is obtained, whether the head or pressure is measured at the fountain head, such as in the air-vessel of the supply to a Weldon oxidiser, or in the gas-holder of a gas-works, or whether it be measured in the gas conduit near to the point of exit of the gases. For all practical work the head should be measured *in the pipe*, and if this be not practicable, a calculation must be made of the head necessary to put the fluid in motion.

If Q = cubic feet of gas per hour,
 l = length of pipe in yards,
 h = inches of water pressure,
 s = Sp. gr. of gas, air = 1.0,
 d = diameter of pipe in inches,

then when h is measured in the pipe or conduit:—

$$Q = 1350 d^2 \sqrt{\frac{h}{s l}}$$

$$h = \frac{Q^2 s l}{(1350)^2 d^4}$$

$$d = \sqrt[4]{\frac{Q^2 s l}{(1350)^2 h}}$$

From the above formulæ it will be seen that *ceteris paribus*, the application of a fourfold pressure, will only result in doubling the quantity of discharge; and that when the length of a pipe is quadrupled the discharge will be only one-half of the original quantity. Again, the quantity of discharge may be doubled by reducing the length of the pipe to one-fourth.

The disturbing causes, operating against the realisation of the theoretical, or undisturbed flow of fluids in pipes, have been fully treated of in Dr. Pole's paper before the Royal Society of 1852, the influence of sudden enlargements, tending to produce eddies, the influence of shape of the entrance, and the effect of bends and irregularities in the pipe, all of which tend to reduce the maximum flow, must be taken into account; and I cannot too strongly emphasise Dr. Pole's remarks when he says:—"Every prudent, practical man knows the necessity of leaving a margin in his calculations for incidental or unforeseen disturbing causes." "The simple rule will often attract a practical man to its use when the complicated one will frighten him away from it altogether. For the same reason, it is desirable, in co-efficients, to employ round numbers, if possible, instead of tiring the patience with a useless array of decimals."

We have already seen how the friction of bends may be approximately estimated in the case of liquids. Dr. Pole

*A course of lectures delivered by Mr. George E. Davis at the Manchester Technical School. All rights reserved.

suggests that in the present state of our knowledge we can only assume that the head necessary to overcome the resistance of a bend may vary as the sp. gr. of the fluids. If such argument is admissible, the following formula will apply to all fluids, whether they be liquid or gaseous :—

$$p = \frac{S v^3 \lambda}{670 \rho} \sqrt{\frac{d}{\rho}}$$

Where S = weight of cb. ft. in lbs.
 v = velocity in ft. per second.
 ρ = radius of curve of bend.
 λ = length of curve of bend.
 h = head of water in feet.
 p = pressure in lbs. per square foot.

The foregoing formulæ have proved very useful to me on several occasions. At one time it was desired to pass 25,000 cubic feet of gas per hour through 26 narrow tubes under a pressure of 3.25 inches of water; the calculated orifices were carefully turned up on the lathe to a gauge, when it was found that 25 of the tubes passed the required quantity, or an error of 4 per cent., which was remedied by slightly reducing the pressure. Of course, it must be remembered that very narrow tubes, especially if they happen to be of any considerable length, will not pass the quantity of gas shown by the formulæ for large pipes. In some experiments which I made several years ago showed that when every care was taken in the calculation to ensure 1,370 cubic feet per hour passing through a pipe, 5.8th of an inch in diameter and five feet in length, in practice only 960 cubic feet were delivered, and it was this circumstance which led me to discover, what I afterwards found was well known, that the pressure should be taken in the pipe itself and due allowance made for friction. I think nothing shows better the effect of friction so well as the bellows aspirators used to withdraw samples of chimney gases for testing purposes. Let the student connect these bellows with a length of 3 feet of half-inch glass tubing, the bellows will open easily; let the half-inch tube be now replaced by one having a bore of 1.8th of an inch, when it will be found a very difficult task indeed to open the bellows quickly. This lesson once learned is not easily forgotten.

The friction of narrow tubes may be approximately calculated by the following formula :—

$$h = \frac{\left(\frac{Q}{60}\right)^2}{(3.7 d)^5}$$

which will sufficiently show how the friction increases as the pipe lengthens, or is narrowed or overworked.

Before concluding the present chapter I would wish to call attention to the properties of gaseous bodies and vapours. This study can scarcely be included in a dissertation on Chemical Engineering, but every student should possess a good knowledge of these things before the study of Chemical Engineering is entered upon. The expansion of gases, the saturation of gases with vapours, heat developed by compression of gases and vapours, and the cold produced by dilatation, are all well set forth in our standard treatises on Physics, and it is to these that the attention of the student is directed.

(To be continued.)

DETECTION OF WOOD IN PAPER.—MM. R. Godeffroy and M. Conlon have worked out a method for estimating the amount of woody tissue in paper, based on the fact that cellulose which has been extracted with water, alcohol, and ether does not reduce a solution of gold chloride, whereas wood pulp quickly reduces such a solution on warming to metallic gold. They find that 100 grms. of well-dried sawdust are capable of separating 14.285 grms. of gold from its solution. In examining paper by this method they remove size by treating the material with cold and hot water, and then extract alumina by washing with an alcoholic solution of tartaric acid. The paper after this treatment is tried and extracted with alcohol and ether, and then treated with the gold solution.

Legal.

THE ACTION AGAINST CALICO PRINTERS F POLLUTION: THE CASE SETTLED.

SCHWABE v. CHADWICK.

THE plaintiffs in this action are Messrs. Salis Schwabe and (who carry on the business of calico printers and bleacher Middleton, in this county, and the defendants are Messrs. Chadwick and Co., who are also in the same line of business at Chadderton, Oldham. The action was before the court at its last sittings in Manchester, and stood part heard. The plaintiffs brought the action to restrain the defendants from polluting a stream of water, which is used by them for the purpose of their bleaching business, by throwing refuse water from their works higher up the stream. Evidence given at the trial that it was the custom of the defendants to pollute the stream with dye refuse, and that the plaintiffs had suffered considerable injury by the polluted water getting into their reservoirs, interfering with their business. Just before the rising of the court yesterday, Mr. Maberly stated that the parties had been able to come to terms in the action, and he desired to mention it now in order that it might be removed from the paper. He was glad to say that they had been able to come to an arrangement, which it was proposed to embody in an order. The parties were *sui juris*, and unless the court desired it he did not know that it was necessary to mention the terms of agreement at which they had arrived.

The Vice-Chancellor said he did not think it necessary that the terms should be mentioned if the parties were agreed. They were all *sui juris*. This was one of the cases in which he thought the parties had acted very wisely in coming to an agreement, and he did not think he should ask counsel to go into details unless they desired him to know them. He presumed that the terms would be such terms as would be within the order of the court, and beyond that he did not wish to know anything more about it.

Mr. Clare said that at the trial of the action his Honour threw a suggestion which the parties had taken advantage of, and which thought was a very reasonable settlement of the dispute.

The Vice-Chancellor said he was sure the parties were indebted to the counsel and the solicitors for great assistance in the matter, and he was glad that they had taken a reasonable course and settled the dispute.

The terms upon which the action has been settled are that the defendants undertake to construct settling tanks to the satisfaction of a surveyor, to be mutually agreed upon between the parties.

THE STRAIGHTENING OF CHIMNEY SHAFTS

BY C. MOLYNEUX AND J. M. WOOD, A.M. INST. C.E.

THE deviation of a chimney shaft from the vertical is often traced to the settlement or giving way of the foundation in consequence of too great a load being placed upon it. In some cases it is due to the rapid rate at which the chimney has been built, whereby mortar in the joints is unable to carry the superincumbent weight; the chimney may have been canted from the vertical by the force of wind whilst the mortar is still soft and yielding. There are also cases recorded in which one side of a chimney was exposed to a continuous period of wet weather, which kept the mortar soft and allowed the shaft to settle on one side.

The work of straightening a shaft is a work of considerable difficulty besides entailing serious risks; in fact, it must be looked upon as a bold piece of engineering, and one in which the utmost caution should be used. All the conditions under which the chimney was built should be known before any work of this character is undertaken; and it is often found advisable rather to rebuild a shaft than to attempt to straighten it. Under no circumstances should an attempt be made to restore the structure to the vertical position, by sawing out the joints, removing courses of brickwork—i.e., “cutting back,” as it is technically called—unless the shell of the stalk is built solid as a whole, one material, and is absolutely homogeneous, the brickwork or masonry being of the highest character throughout. Many existing brick chimneys have been successfully cut back in the hands of skilful and cautious men, but, on the other hand, many have received fatal cuts, and have either fallen under the operation or a short time afterwards, among which may be mentioned the noted Newlands Mill chimney. The cutting back of stone shafts is seldom attempted, there being only a few successful cases recorded. When it has been decided to straighten a chimney the aid of a specialist or professional “chimney doctor” should be called in: for his experience and staff of workmen, &c., are essential to the successful treatment of the case.

first operation is to determine exactly how much the shaft from the vertical, and from this a careful calculation is to find the necessary gap or depth of the cut. The cut should wedge shape, with a maximum opening at the outer circumference tapering away to nothing at the centre. Allowance has to be made for settlement, so that the chimney shall not afterwards incline in opposite direction. When the deviation is considerable, it is to make several cuts—i.e., at several joints; but in no case they be close together. If the shaft deviates, as a whole, from the vertical, the cut is made as low as possible. It is borne in mind that when once a chimney has been partly cut through, its stability depends entirely upon its own weight, and the bed joint being destroyed; it is, therefore, advisable to keep the cuts as low down as is practicable. When a brick chimney is of considerable diameter, the method sometimes adopted is to cut out either one or two courses of bricks half-way round the chimney on the side opposite to that towards which the chimney has to be replaced the same by a thinner course of brick or hard stone shape form. In executing this operation the brickwork is cut in segments of, say, about 2 ft., and is replaced by a thinner course. The first incision is made directly opposite to the direction in which the shaft leans; the next incision is made to the right or left, and so on alternately until one-half of the chimney has been cut through. As this work proceeds wedges are driven in to keep the cut from closing; the cutting out can be carried out from both the inside and the outside at the same time by the aid of long chisels. As soon as the chimney has been made half way round, and the wedges slackened, a loud noise is almost invariably heard, which is caused by the breaking of the joint. The chimney begins to move, and by slight adjustments slowly settles down on the thinner inserted course. A chimney in Prussia, 331 ft. in height, was successfully cut back by this method.

The usual plan, however, now adopted is to make an incision into the shaft, as above described, and insert, as the brickwork is removed, strong steel screwjacks, whose function is to support the incumbent mass above as the masonry in the cut is removed. The jacks are from 7 in. to 10 in. in length; above and below them are placed strong wrought iron plates to distribute the load and obtain a bearing. When the cut has been completed, and the jacks all set at their proper places, the next operation is to gradually and gently unscrew them, till the shaft has nearly regained its vertical position. The space between the jacks, and finally that occupied by them, is filled in with solid brickwork. It is usual to commence by good the cut before the chimney has quite returned to the vertical position, otherwise the slight settlement of the new work will incline the chimney in the opposite direction.

Townsend Shaft, Glasgow, was straightened by sawing out the brickwork from the inside; no less than 12 cuts were made in the shaft, at a height of 4 ft., and the last 326 ft. from the ground line. In this operation, the shaft was stated to be 7 ft. 9 in. out of the vertical; it came back in a slightly oscillating manner, and the men well when it was returning by the saws tightening. (See *Ban-ner on Chimneys*.) A few years ago a very massive chimney, 110 ft. in height, at the Royal Arsenal Gasworks, was successfully straightened. The foundation settled, and the shaft inclined 3 ft. 6 in. from the vertical. Notwithstanding that calculations were made and showed that it could remain more than 3 ft. out of the perpendicular without over-reaching the limit of safety, it was deemed advisable to cut it back, and this was accordingly done. In conclusion, it may not be unnecessary to warn proprietors of chimneys against unscrupulous practitioners claiming to be "key doctors," but who are quacks and incompetent men, and who are ready to undertake any sort of work of this description. *W. J. S.*

THE CONCENTRATION OF LABORATORY REAGENTS.

In a recent number of the *Berlin und Deuts Chemical Ges.* (1890, 31), R. Blochmann calls attention to a matter which, we know by experience, is too often overlooked, though an important element of systematic conduct of a laboratory—that is, the concentration of reagents employed. It only needs to be pointed out to be at once recognised by those who may not have considered this, even as a part of the routine of chemical work, that the ordinary operational analysis would gain very much in precision by the adoption of a plan in the preparation of reagents; and the expediency of such a plan being granted, preference would instinctively be to that based upon chemical equivalents. There is, of course, nothing essentially novel in the proposal to extend to the whole of the reagents of a laboratory, the plan of standard solutions, adopted in strictly volumetric analysis; indeed,

we believe that in most technical laboratories a systematic preparation of reagents, those at least which are in constant use, is commonly adopted. Further, we believe we are correct in stating, as a historical instance, that John Mercer carried out the plan of working with reagents in the form of equivalent solutions, not only in the laboratory but in the colour-shop. The suggestion, therefore, though not more novel than the non-adoption of the plan may have made it, obviously commends itself to the attention of chemists, more especially, perhaps, to those who have the conduct of educational laboratories. The advantage of inculcating automatically the first principles of the science with the handling of every reagent by the student need scarcely be insisted upon.

If Shakespeare could be eloquent respecting "Sermons in stones," how much more modern chemical students, anent "professors in bottles!"

We need make no apology to the author of the paper in question for reproducing the tables which he gives of the composition of the principal reagents made up, for the most part, on the plan of normal solutions, as follows:—

I.—CONCENTRATED ACIDS.

	Sp. gr.	Wt. p.c.	1 litre containing
Hydrochloric acid ..	1.160	31.8	369 gr. approx. 10 HCl.
Nitric ..	1.305	48.1	628 " " 10 HNO ₃
Sulphuric ..	1.840	96.0	1,767 " " 36 H ₂ SO ₄

II.—NORMAL SOLUTIONS.

(a) $\frac{1}{2}$ normal	wt. p.c.	(b) $\frac{1}{2}$ normal	wt. p.c.
Hydrochloric acid	7.1	Barium chloride (crystal)	11.2
Nitric acid	11.8	Calcium chloride	10.5
Sulphuric acid	9.2	Iron chloride (Fe ₂ Cl ₆)	5.2
Acetic acid	11.8	Potassium sulphate	8.1
Oxalic acid	12.3	Magnesium sulphate (crystal)	11.6
Tartaric acid	14.1	Copper sulphate (crystal)	11.6
Potassium hydrate	10.3	Sodium disphosphate (crystal)	11.4
Sodium hydrate	7.4	Lead acetate (crystal)	16.9
Ammonia	3.5	Potassium chromate	9.0
Ammonia sulphide	6.8	Potassium ferrocyanide	10.0
		(c) $\frac{1}{2}$ normal.	
Ammonia chloride	10.4	Platinum chloride	8.0
Ammonia carbonate	9.4	Silver nitrate	8.0
Sodium carbonate (ant.)	9.6	Mercuric chloride	6.4
Sodium acetate (crystal)	25.2	Sodium nitrate	6.2

III.—OXIDISING AND REDUCING AGENTS.

(1 litre = $\pm \frac{0}{2}$ = 8gms. oxygen.)

	wt. p.c.	1 litre contain.
Potassium bichromate	4.7	$\frac{1}{6}$ K ₂ Cr ₂ O ₇ = 49.00%
Sodium hypochlorite	3.7	$\frac{1}{2}$ NaClO = 37.2%
Potassium nitrite	4.2	$\frac{1}{2}$ KNO ₂ = 42.5%
Stannous chloride (crystal) ..	10.5	$\frac{1}{2}$ SnCl ₂ · 2Ag = 112.5%

IV.—SATURATED SOLUTIONS.

	wt. p. ct. at 15°	Ratio to normal solution.
Hydrogen Sulphide ..	0.48 H ₂ S	1 : 3.5
Barium hydrate	5.95 Ba(OH) ₂ · 8H ₂ O	1 : 2.6
Calcium hydrate	0.13 Ca(OH) ₂	1 : 21.5
Calcium sulphate	0.26 CaSO ₄ · 2H ₂ O	1 : 33.0
Bromine (water)	3.23 Br.	1 : 2.5 (g)

It is unnecessary to enter into the details of carrying out this plan. It is sufficient to have reproduced for our readers the outline of a very practical and instructive suggestion.

THE TECHNICAL INSTRUCTION ACT.

AT the last meeting of the Manchester School Board, the Chairman made a statement with regard to the position of the Board in reference to this matter. He said that on the 14th of February a deputation representing the principal bodies in Manchester having control of science and art instruction waited upon the City Council with a memorial urging the adoption in Manchester of the Technical Instruction Act, 1889. At a recent meeting of the Council a special committee was appointed to report upon this matter. As it was very desirable that the Board should be in a position to supply the City Council with all necessary particulars in case it was decided to give a grant under the new Act in aid of science and art classes, he had thought it well to bring before the meeting the question of the appointment of a special committee to supply any information that might be needed by the City Council relative to the Board's science and art and commercial evening classes. For the information of the Board he had

taken out certain particulars relative to science and art instruction in Manchester. These were the official figures published by the Science and Art Department in their twenty-sixth report, issued in May of last year. First, as to science classes, the number under instruction in Manchester School Board classes was 2,404, and the amount of the grant £2,739. 12s.; in classes conducted by other bodies in the city, 2,128, grant, £1,134. Then as to art classes, the number under instruction in Manchester School Board classes was 1,402, and the grant £400. 12s.; in classes conducted by other bodies in the city, 2,105, and the amount of grant £1,316. 9s. Taking for the basis of comparison the Government grants earned by the science and art classes in Manchester, it appeared that the total sum paid by the Government during the year 1887-8 was £5,590. 13s. Of this amount the sum of £3,140. 4s. was earned in classes conducted by the Board. In view of the assistance which it was hoped that the City Council would give to science and art and commercial instruction, under the the Technical Instruction Act, 1889, the Board in November last adopted a comprehensive scheme for the better organisation of their evening classes. According to this scheme there would next winter be opened science and art schools at the following five centres:—Waterloo-road Board School, Cheetham; Birley-street Board School, Beswick; Bangor-street Board School, Hulme; St. Matthew's Board School, Ardwick; Central Board School, Deansgate. It was proposed that there should be a systematic course of science and art instruction at the foregoing centres, and as the experiment of the commercial evening school at the Central School, Deansgate, had been a great success this session, it had been resolved to open four commercial evening schools next autumn, namely:—Ducie-avenue Board School, Greenheys; Waterloo-road Board School, Cheetham; St. Matthew's Board School, Ardwick; Central Board School, Deansgate. The object of the Board was to group their evening instruction in science and art and commercial subjects at the above-named centres. As it would be necessary very soon to complete the arrangements for the various evening schools to be opened by the Board next session, it was desirable to provide the City Council with full particulars regarding the work of the School Board in providing science and art and commercial evening instruction, in case it was decided to adopt the powers of the new Act of Parliament. With the approval of the Board the matter might well be referred to the sub-committee which organised the evening schools and classes last winter, with the addition of such other members as it might be thought well to add.

Mr. Schou said the Council would probably impose a halfpenny rate for the purposes of the Technical Instruction Act. He understood that other educational bodies in Manchester intended to make large demands, and the School Board must take care that it received its due share.

Mr. Nunn asked if the commercial classes were self-supporting.

The Chairman said they were, but the fees were too high for many of those who desired to attend.

A sub-committee was appointed, in accordance with the suggestion of the Chairman.

COLOURING WORKING DRAWINGS.—A "Draftsman" writes to the *Builder and Woodworker* as follows:—"The colours used for representing wood, iron, and other materials, are: For soft pine, a very pale tint of sienna; for hard pine, burnt sienna, with a little carmine added; for oak, a mixture of burnt sienna and yellow ochre is used. Mahogany is represented by burnt sienna and a portion of dragon's blood. For walnut, dragon's blood and burnt umber are used. For bricks, burnt sienna and carmine make a good colour. Gray stones are represented by a mixture of black and white, with a little of prussian blue and carmine added—pale ink alone is sometimes used for stone work. Brown freestone is represented by burnt sienna, carmine and ink. Wrought iron is represented by a light tint of prussian blue, and cast iron by a gray tint composed of black, white, and a little indigo. Brass is tinted with gamboge. Gamboge, slightly mixed with vermilion, makes a good colour for copper. Silver is represented by an almost invisible blue. Make use of the best colours only. Do not mix with too little water. If the first coat is not dark enough, wait till dry, and give another coat. Make up your mind what portion you are going to colour before applying a drop of paint. Do not stop in the middle of a wash, but when once the brush touches the paper, go straight through with the portion you begin. If obliged to leave the job for a minute, paint up to a line. A dotted line will do if there is not a "full one handy; this will hide the join between the two patches of colour. Do not let your brush be too wet nor too dry, a few trials will soon show the right amount of colour to take up. Use the best English drawing paper; if you then find any trouble, a little prepared ox-gall mixed with the colour will do wonders. Clouded drawings, as a rule, are caused by letting the work dry and going over the edges again when starting afresh. No piece of colouring should be left until finished.

EXTRACTS FROM THE BOARD OF TRADE JOURNAL.

NEW CUSTOMS TARIFF OF VICTORIA.

The following rates of import duty are now levied under the Customs tariff of Victoria, dated the 4th November last:—

Classification of Articles.	Rates of Duty.
Acid, acetic, containing not more than 30 per cent. acidity.....	Pint or lb. 0 0
Do., do., for every extra 10 per cent. or part of 10 per cent. above 30 per cent.	" 0 0
Do., muriatic	Cwt. 0 5
Do., nitric	" 0 5
Do., sulphuric.....	" 0 5
Ammonia, carbonate of.....	Pint or lb. 0 0
Do., liquid	" 0 0
Chlorodine	25% ad. val.
Cocculus Indicus.....	Lb. 0 1
Gelatine	" 0 0
Glycerine, pure.....	" 0 0
Do., crude	" 0 0
Morphia	Oz. 0 1
Nitrate of silver	Lb. 0 0
Nux Vomica	Lb. 0 0
Strychnine	Oz. 0 1

CUSTOMS TARIFF OF JAMAICA.

The following is a statement of the rates of import duty now levied under the Customs tariff of Jamaica:—

Classification of Articles.	Rates of duty now levied.
Ale, beer, and porter.....	Gall. 0 0
Candles, composition	Lb. 0 0
Gunpowder	" 0 1
Indigo	" 0 0
Lard	" 0 0
Matches, lucifers and others, per gross of 12 dozen boxes, each box to contain 100 sticks, and boxes containing any greater or lesser quantity to be charged in proportion	0 5
Salt	100 lbs. 0 1
Soap	" 0 5
Spirits: Brandy	Gall. 0 10
" Gin.....	" 0 10
" Rum, the produce of and imported from British possessions.....	" 0 10
" Whiskey	" 0 10
Spirits of wine, alcohol and all other spirits, cordials, or spirituous compounds.....	" 0 10
Sugar, refined	Lb. 0 0
" unrefined	100 lbs. 0 10

THE EFFICIENCY OF CHIMNEYS.

THE "*Journal du Gaz et de l'Electricité*" quotes from a German source some experiments upon works' chimneys. An old chimney 67 feet high, with internal diameter of 19'6 to 13'8 inches, and total passage, from fire to chimney top, of 98 feet, was taken down and a new chimney, with an intended total draught of 95 feet and a minimum internal diameter of 25'5 inches, was planned out. The chimney had gone up 39 feet it was tried; already there was great improvement on the old chimney; again at 46 feet, still better, and at 52½ feet the draught was excellent, the smoke issued without soot; and there was an economy of from 15 to 20 per cent fuel; so the chimney was finished at that height. Herr Huth tells that chimneys are usually made too narrow, and the mischief is aggravated by increasing their height; so fuel escapes unburned. Herr Ramme of Gotha, confirms this, and recommends a uniform internal diameter being more rational, and as protecting the brickwork from the and rapid axial stream. The cross-section of the chimney should be from one-fourth to one-eighth the grate-area; and the height, not less than 50 feet, should not exceed 100 to 120 feet (the diameter being 1 to suit) unless the chimney is at a distance, in which case it may be 160 to 200 feet, the diameter being regulated according to the amount of soot which escapes.

CALIFORNIA QUICKSILVER.

I report to the *Engineering and Mining Journal*, Mr. J. Pl., of San Francisco, gives the following table, showing the of the several California mines for the past six years:—

	1884.	1885.	1886.
Almaden	20,000 ..	21,400 ..	18,000 ..
Consolidated	2,931 ..	1,309 ..	3,478 ..
Western	1,316 ..	2,197 ..	1,769 ..
Bank	3,292 ..	3,469 ..	1,949 ..
Idria	890 ..	1,296 ..	1,449 ..
Eastern	1,025 ..	1,144 ..	1,406 ..
Redington	332 ..	446 ..	735 ..
Lupe	881 ..	385 ..	409 ..
Consolidated ..	1,179 ..	35 ..	..
..	..	..	..
..	7 ..	392 ..	786 ..

Total flasks..... 31,913 .. 32,073 .. 29,981

	dols.	dols.	dols.
Best price per flask ..	26'00 ..	28'50 ..	32'00 ..
Best price per flask ..	35'00 ..	32'00 ..	39'00 ..
Age per flask	30'50 ..	30'25 ..	35'50 ..

Al value at average price..... 975,000 .. 970,000 .. 1,060,000

	1887.	1888.	1889.
Almaden	20,000 ..	18,000 ..	13,100 ..
Consolidated	2,694 ..	950 ..	..
Western	2,880 ..	4,065 ..	4,500 ..
Bank	1,446 ..	625 ..	550 ..
Idria	1,890 ..	2,164 ..	2,150 ..
Eastern	1,490 ..	1,320 ..	1,000 ..
Redington	689 ..	1,151 ..	1,350 ..
Lupe	673 ..	126 ..	800 ..
Consolidated ..	..	..	..
..	1,543 ..	3,848 ..	1,700 ..
..	455 ..	992 ..	500 ..

Total flasks..... 33,760 .. 33,250 .. 25,650*

	dols.	dols.	dols.
Best price per flask...	36'50 ..	37'00 ..	40'00 ..
Best price per flask ..	48'00 ..	48'00 ..	50'00 ..
Age per flask	42'25 ..	42'50 ..	45'00 ..

Al value at average price, \$1,425,000, \$1,415,000, \$1,154,000.

Total production for 1889 is a near approximation.

ing to Mr. Randol, the monthly production and highest and prices prevailing during the past year have been as follows:—

Month.	Monthly production. Flasks.	Highest price per flask.	Lowest price per flask.
January.....	2,270 ..	\$43'00 ..	\$41'50 ..
February.....	1,740 ..	42'00 ..	41'50 ..
March.....	2,125 ..	41'50 ..	40'00 ..
April.....	2,134 ..	41'00 ..	40'00 ..
May.....	1,840 ..	45'00 ..	41'00 ..
June.....	2,225 ..	50'00 ..	46'50 ..
July.....	2,021 ..	47'50 ..	46'00 ..
August.....	2,060 ..	47'50 ..	46'00 ..
September.....	2,030 ..	47'50 ..	46'00 ..
October.....	2,440 ..	47'00 ..	46'50 ..
November.....	2,460 ..	48'00 ..	46'00 ..
December.....	2,705* ..	48'00 ..	47'00 ..

ber product estimated.

ing, Mr. Randol says: "The total production for 1889, flasks, compared with the previous year, shows a decrease of 25,000 flasks, and is the smallest quantity in any year since 1873, when production was 27,642 flasks. New Almaden's production shows 9,900 flasks, and is its lowest yield since 1874, when its production was 9,084 flasks. Napa Consolidated retains its position of highest producer, and increased its output to 4,500 flasks, a 35 flasks. Aetna was dropped off the list. Bradford, the 10th rank last year, produced only 1,700 flasks, a loss of 2,148 flasks. Great Western produced 550 flasks, a loss of 75 flasks. Sulphur also shows a slight decrease, 2,150 against 2,164. New Almaden, a like misfortune, 1,000 against 1,320. Great Eastern, an increase, 1,350 against 1,320. Redington, in a last ex-

piring effort, turned out 800 against 126. And various odds and ends of mines gathered 500 against 992 in 1888.

"This decrease all along the line (except Napa Consolidated) emphasises the poverty of the mines; the higher price of quicksilver has failed to arrest the decline in production, and the future outlook is far from hopeful. Still higher prices must prevail in 1890; and this industry must be protected by a liberal duty—at least ten cents per pound—otherwise we may look for a further decline in production, to a point where the output will be insufficient to pay costs; and then—extinction."

REPORT ON THE USE OF THE MIXED INDIGO AND INDOPHENOL VAT.

By M. GALLAND.

(Chemist at Loenach Mulhouse Industrial Society).

THIS short note deals with the mixed vat (indigo and indophenol), the idea of which is due to the firm of Durand, Huguenin and Co., and I should like to call your attention, not only to its evident economy, but also to the fact that the two colours are taken up at the same time.

The reducing agent best adapted for use with the mixture of these two colours is sodium hyposulphite, which was discovered by M. Schutzenburger, and applied by him and M. de Lalande to the reduction of indigo. The vat is made up as follows:—Into a cask of 500 litres capacity, 30 litres of ground indigo, to which 3·5 kilos. of indophenol have been previously added, are put

Ground indigo.... { 10 kilos. indigo,
30 litres of water,
2 litres of soda at 35°.

These are left in contact for twelve hours and then ground up for six hours.

To this mixture is added 48 litres of sodium bisulphite solution of 40° B., and then slowly, so as to avoid too great a rise of temperature, 9 kilos. of zinc dust suspended in 10 litres of water. The whole is well stirred for half-an-hour, and 30 litres of caustic soda at 38°B added. This done, it is made up with water to 500 litres and allowed to stand for two or three days. The dyeing vat has a capacity of 5,000 litres. To make it up the contents of two casks of the above mixture are poured into 4,000 litres of water, to which sufficient hyposulphite has previously been added to absorb the dissolved oxygen. The amounts required by our vats are:—

2 kilos. of zinc dust,
12·5 litres of bisulphite at 40° B.
25 litres water,
8 litres caustic soda at 38°.

A vat thus made up imparts the dark shade (corresponding to 450-500 grammes of indigo by the old process) to 30 pieces of cotton passed through three times at such a rate that the fabric remains two minutes in the liquid, care being taken to keep the vat up to strength, and to reduce at the end of each operation, and to subsequently chrome the cloth in a cold solution containing 2 grammes of bichromate of potash per litre. To restore the vat, 123 litres of the mother liquor are added for every passage of 30 pieces, corresponding to 2·5 kilos. of indigo.

Working in this manner, each piece requires for the shade mentioned above only 250 grammes of indigo.

We have never exceeded this amount since we commenced to work with a mixed vat reduced by hyposulphite.

When a vat has been worked it is well to ascertain by a dyeing test on a small scale its state of reduction, and to add the amount of hyposulphite requisite to reduce it to its former condition.

This method of procedure is very simple and easy of application. The bath is much clearer than in the other process, does not so soon become muddy, and gives much more uniform shades. The treatment with chromate is quite as satisfactory as when indigo alone is used.

In proof of the statement made at the commencement of this article, namely, that both the colours are taken up at the same time, it may be mentioned that when a portion of the fabric is treated with alcohol, the indophenol dissolves even in the cold, leaving the insoluble indigo on the fibre. If the above instructions be rigidly adhered to, no difficulties will be experienced in the working of the mixed vat, the economy of which is obvious.—*Moniteur de la Teinture.*

CHEMICALS AND STRIKES.—The inter-relationships of manufactures are illustrated by the fact that the strikes in Lancashire have given activity and animation to the chemical trade of Durham. The explanation is simple: users abroad find a difficulty in obtaining chemicals in Lancashire because of the stoppage of fuel supply; and the orders for Germany and for America are coming to this side. The increased trade may be a temporary one—probably it will be—but in the meantime the chemical makers here benefit, as well as some ship-owners.

A NEW METHOD OF PYRITES ANALYSIS.

THE sulphur in pyrites can be accurately estimated in a comparatively short time by the following method, which is more especially advantageous when the sample contains substances which render the application of solvents more difficult, but allow of the expulsion of the sulphur in the dry way.

The finely divided pyrites is placed in a small boat and introduced into a combustion tube which can be heated in a small furnace. A current of air (about 150—200 bubbles per minute), dried by means of sulphuric acid and saturated with nitric acid vapor by passing through a Dreschel's flask containing about 54 c.c. of fuming nitric acid, is passed through the combustion tube into a tubulated receiver containing 100 c.c. of bromine water, to which is attached a Peligot's tube containing 40 c.c. of bromine water, and finally through a cylinder of distilled water.

The pyrites is gradually heated, commencing at the hinder portions of the tube, the front parts being also warm to prevent the condensation of the sulphuric acid. In about three-quarters of an hour, the process being at an end, the Dreschel's flask containing nitric acid is removed and the boat is allowed to cool slowly in a stream of air. The sublimation of the sulphur by too rapid heating is to be avoided.

The contents of the receivers are washed into a beaker, the excess of bromine evaporated, the solution mixed with 1 c.c. of concentrated hydrochloric acid, heated to boiling, and the sulphuric acid precipitated with barium chloride; the precipitate must be carefully washed with boiling dilute hydrochloric acid, to free it from barium nitrate, but any admixture with this salt can be avoided by evaporating completely in a porcelain basin before adding the barium chloride.

The boat containing the ferric oxide, which is quite free from unchanged pyrites, is warmed with concentrated hydrochloric acid, the solution evaporated almost to dryness and the insoluble residue estimated in the usual manner; the iron solution is completely free from sulphuric acid.

Two analyses by this method gave the following results:—

	Per cent.		Per cent.
Sulphur.....	52.59	..	52.67
Iron	45.67	..	45.52
SiO ₂ , &c.....	1.08	..	1.12
	99.34		99.31
			<i>Ex.</i>

ALUMINOUS GLASS.

IT is well known that certain varieties of glass when exposed to the action of fire, even for a short time, become opaque and the surface roughened.

Certain products of Thuringia, on the contrary, enjoy a well merited reputation, because glass coming from the manufactories of that country supports without deterioration fusion, remelting, reblowing, etc. This property has been attributed to the introduction of a certain sand obtained from a neighbourhood of the village of Martinsroda.

It is interesting to understand the chemical composition of this sand.

Schott has made the following analysis of the sand, and side by side are the results of an analysis of the glass made from it.

	Sand from Martinsroda.	Glass made with sand from Martinsroda.
Silica	91.38	67.74
Alumina	3.66	3.00
Oxide of Iron.....	0.47	0.42
Lime	0.31	7.38
Magnesia.....	none	0.26
Oxide of Manganese	traces	0.52
Potash	2.99	3.38
Arsenious acid	none	0.24
Soda	0.50	16.01
Total	99.31	98.95

The extremely constant proportion of alumina in both sand and glass is remarkable, and calls for attention.

In order to arrive at the exact significance of the presence of this base, various experiments were undertaken with glass, some samples being made with pure silica, and others were used into the composition of which a little alumina had been introduced in quantity about equivalent to that contained in the sand of Martinsroda.

In submitting these different glasses thus prepared to the operation

of remelting down into window glass, it was evident that it was more easily effected in those samples which contained the alumina.

In short, these experiments, which were very thorough, proved the admixture of feldspar or alumina communicated to the glass greater strength, and made it more easy to work.

M. Schott attributes these advantages to the property which alumina possesses of lessening the volatilisation of their alkalis in the superficial layers, and preventing that crystalline structure which characterises an easily broken glass, and which is due to the tendency of the double silicate of calcium and sodium to take the form of crystals. —*Scientific American.*

AN ADVANCING MARKET FOR ALKALIES IN AMERICA.

SINCE the beginning of the year there has been a steady though gradual advance in the market prices for soda ash and caustic soda, and there is no indication yet that the top of the market has been reached. In fact, if present indications hold good, prices will be higher during the balance of 1890 than they have been at any within many years. Apart from the fact that the manufacturers are tired of losing money in unprofitable competition, there are several reasons for the upward movement of prices, and but for the fact that there are two distinct processes of manufacture, between the expense of which competition is extremely active, the rise would no doubt be greater and would have come sooner.

The chief reason for the advance is found in the increased cost of salt, owing to the control exercised over that commodity by the Union of Great Britain. To some of the larger alkali makers this itself, would have been of no consequence since they are independent of the combination having salt wells of their own, but to the smaller concerns, whose product in the aggregate makes up the bulk of the supply of these chemicals, the restriction placed upon them by the advance in the cost of salt is a very serious matter. The old process men feel more keenly than their competitors who use the newer method of manufacture, but to either class of producers the increased cost of raw material is a most potent reason why they should get more money for their product. A second reason is found in the advance in the price of oil, and a final reason to some of the makers and will probably soon be all, is the higher cost of labour.

If there are so many good reasons for the advance, the opportunity to make it with the best results is not lacking. For the past four months, but particularly since the beginning of the current year, demand for soda ash and caustic soda has been unprecedentedly large. The consumption all over the world seems to have increased enormously. In this country, although the receipts have increased over ten or twelve per cent. during the past two months, and the supply has been increased by the added output of domestic factories, it is almost impossible to secure anything for prompt or early delivery, and many of the manufacturers have their product for several months to come under contract. At the present rate of consumption it seems likely that there will not be enough stock of soda ash to supply all requirements by the spring weather arrives, and caustic soda is in almost the same position. —*Oil, Paint, and Drug Reporter.*

PRICE'S PATENT CANDLE COMPANY (LIMITED), reports that the business in 1889 has been satisfactory, although, as the shareholders were informed by last year's report would be the case, except that expenditure took place to meet growing requirements in some branches of the trade. Adopting the usual comparison for three years of ordinary expenditure on replacements and repairs and on new machinery and plant, the yearly cost has been:—Replacements and repairs—£26,248.; 1888, £22,863.; 1889, £30,140.; new machinery and—1887, £4,197.; 1888, £3,972.; 1889, 6,203. The ordinary extraordinary expenditure on the two factories amounted in 1887, £37,133., as against a corresponding expenditure of £28,836. in 1888, and the company has obtained full value for the outlay. The profit in 1889 amounted to £70,289. 6s. 11d., to which has to be added £5,603. 17s. 10d. carried forward from the previous year, making together £75,893. 4s. 9d. Deducting the dividend paid in September last, £18,750., £10,000. for depreciation of plant, and, as the directors recommend a like sum in reduction of the goodwill account, there remain an available sum of £37,143. 4s. 9d. Out of that sum the directors recommended the payment on the 18th March of a dividend of 10s. and a bonus of 5s. per share, making with the September dividend a distribution of 25s. per share for the year. Such a payment would absorb £28,125., and will leave £9,018. 4s. 9d. undivided. In exercise of their statutory power, the directors unanimously appointed Calderwood, who had been the company's manager since March, to the seat at their Board, rendered vacant by the death of G. Brownrigg, C.B., with the title of Managing Director, and the confident that the appointment meets, and will continue to meet the hearty approval of their fellow-shareholders.

EXPERIMENTS WITH OXYGEN CYLINDERS.

RIES of experiments were recently conducted at Stevenston the Scotch and Irish Oxygen Company, Limited (Brin's) for the purpose of demonstrating the absolute safety of their for containing compressed gases. It will be remembered that an accident occurred to the foreman of their works, at Polk, the bursting of a cylinder some six weeks ago, and the impression was conveyed to the public that the explosion was due either to a defect in the cylinder, or to its strength being overtaxed by being urged to an excessive pressure. A thorough investigation was made into the cause of the accident, and the facts disclosed that it occurred through a mistake on the part of the workman himself. It was clear that he had introduced oxygen into a cylinder which was already partly charged with hydrogen, thus forming an explosive mixture when brought together. One fact which pointed at once to this conclusion was that a portion of the exploded cylinder, found almost on the spot where the accident occurred, was almost too hot to be touched; whereas, the portions of cylinders which have since been introduced by being subjected to excessively severe treatment and to be perfectly cold. In consequence of this erroneous conclusion it was thought advisable to subject the cylinders to an extensive series of tests, so as to prove beyond dispute that they are fully adapted for the purpose of carrying the gases, and capable of withstanding the most extreme amount of rough usage to which they might possibly be subjected during transit from place to place. Cylinders used are of different sizes, varying from 1 ft. long by 3½ in. diameter to 6 ft. 6 in. long by 5½ in. diameter. They are made of wrought steel ¼ of an inch in thickness, and before being used each cylinder is subjected to a hydraulic test of at least twice its working pressure, and is afterwards stamped with the pressure to which it is subjected, the date of the test, and the test mark. The cylinders are tested periodically, and for the purposes of safety the custom of painting has been to paint those for the different gases in distinct colors, so as to avoid the danger of mixing. As a further precaution every cylinder which is brought into the works after being in use is at once emptied. To make the recurrence of such a misfortune as the recent accident absolutely impossible, it has been decided to adopt a left-handed thread for the valves on the oxygen and coal gas cylinders, so that by no possible inadvertency they be filled at the oxygen pump. A number of experiments were made about ten days ago which gave excellent results. A cylinder, weighing about 1 cwt., was twice raised to the height of 35 ft. and dropped horizontally upon a solid iron block 12 in. long and weighing 3½ cwt., each blow bending it to the extent of one-quarter of an inch. It was then dropped vertically on to its end, having a clear fall of 31 ft., when it was found that the cylinder had only flattened a part of about the size of a pennypiece. A next piece of plate was placed across the iron block, and an iron weight of 100 lb. was dropped on to its centre from a height of 35 ft., the blow bending it to the extent of ¼ of an inch. The cylinder was then placed on two iron blocks, set 4 ft. 1 in. apart, so as to rest on the ends, and the same weight again let fall upon it from the height of 31 ft., with the result that it was bent 4½ in. from the ends, but did not explode. Another cylinder was afterwards tested in the same manner, with the exception of the crushing blow, in this case even a more satisfactory result was obtained, as it was bent to the extent of 7½ in. by the bending blow and still remained perfectly sound. A smaller cylinder, measuring 31 in. long by 5½ in. diameter, containing 17 lb. of liquified carbonic acid gas, was also dropped crosswise vertically from the same height, and was afterwards flattened to the extent of 1½ in. by dropping the 6¼ cwt. upon it, without it otherwise than in shape. Each of these tested cylinders was subsequently found to contain the full quantity of gas, and to be perfectly sound. Yesterday's experiments were of a similar character, and equally satisfactory. A 6 ft. 6 in. cylinder, weighing 107 lb., full of the contents, was dropped four times across the iron block from a height of 35 ft., these trials producing a bend of 2½ in. It was then allowed to fall on its end, with little perceptible result. A cylinder was treated in the same manner, and sustained no injury. From these particulars it will be seen that the tests were eminently satisfactory, for it is inconceivable that cylinders during transit could undergo anything like the severe tests to which they were subjected, while it was evident that they possessed a considerable reserve of strength.

WIDNERS SALT SCHEME.—We understand that a number of miners have withdrawn from the scheme. The bed of rock salt through which is 60 feet thick, and it was met with at about 250 ft. in the surface, but there are some physical difficulties in the way of its satisfactory.

THE
PERMANENT CHEMICAL EXHIBITION,
32, BLACKFRIARS STREET,
MANCHESTER.

THIS EXHIBITION will be formally OPENED on TUESDAY, APRIL 15TH. Further particulars will be duly announced in our next issue.

Exhibitors are urgently requested to complete the arrangement of their cases before Saturday, April 12th.

The following Firms already have their Exhibits *in situ* :—

Blackman Air Propeller Ventilating Co., Ltd. London.
G. G. Blackwell and Co. Liverpool.
Bracher and Co. Wincanton.
Brunner, Mond and Co., Ltd. Northwich.
Buckley Brick and Tile Co., Ltd. Buckley, via Chester.
Ashmore, Benson, Pease and Co. Stockton.
W. F. Clay Edinburgh.
Clayton Aniline Co., Ltd. Clayton, Manchester.
J. Cortin Newcastle-on-Tyne.
Doulton and Co., Ltd. Lambeth, London.
Grimshaw Bros., Ltd. Clayton, Manchester.
Jewsbury and Brown Manchester.
C. R. Lindsey and Co. Clayton, Manchester.
Chas. Lowe and Co. Reddish, near Stockport.
Manchester Aniline Co. Manchester.
Moldrum Bros. Manchester.
E. D. Milnes and Brother Bury, Manchester.
Musgrave and Co. Belfast.
Newcastle Chemical Works Co., Ltd. Newcastle-on-Tyne.
Alfred Smith Clayton, Manchester.
Worthington Pumping Engine Co. London.

For particulars as to space, etc., apply—

DAVIS BROS.,
32, BLACKFRIARS STREET,
MANCHESTER.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects :—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered :—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

Trade Notes.

ANOTHER TRUST.—The large smelting organisations of the United States have formed a trust, with a capital of £5,000,000. All but five of the smelting and refining companies in the United States are reported to be in it. Of the capital stock £3,000,000. is to be Common stock, and the remaining £2,000,000. Preferred stock. The chief object of the smelters, it is said, is to place their interests beyond the absolute control of the Lead Trust.

WHAT MAY HAPPEN.—As underground conductors make way in London, we may occasionally expect something like this in our dailies, unless precautions, in the nature of those which we have already indicated, are provided. A New York paper of recent date says: "A manhole plate of ordinary size covers a manhole in the bend of Minetta-street. Yesterday that plate sailed skyward for a dozen feet, followed by a volume of flame beautiful to behold, and attended by a crash of glass from near-by windows, and a reverberating report."—*Electrical Review*.

AMMONIN.—This is a product made at Heidelberg, and said to be of great value for cleansing, prior to bleaching, not only cotton but all kinds of vegetable fibres. The method of manufacture is kept secret. It is a grey powder, colourless, and partially soluble in water; an analysis made by Dr. Zirmite shows it to contain 27 per cent. of soluble matters, 21 per cent. of which was carbonate of soda; 30·8 per cent. consisted of silica and oxides of iron and alumina; there was 34 per cent. of lime, with small quantities of sulphide of lime. Where the cleansing properties come in one fails to see; better results could be got by using plain soda-ash.

THE ADULTERATION OF TALLOW.—Tallow is sometimes adulterated with stearic acid, and to detect the fraud H. Jaffe proposes to estimate how much standard alkali the sample absorbs. He warms 5 grammes of the tallow with 10 grammes of olive oil; adds a little turmeric solution as indicator, then runs in the standard alkali, keeping the mixture at 20° to 30° C. Olive oil should not show more than 2·5 per cent. and tallow 3·6 per cent. free acid. Stearic acid is equivalent to 100 per cent., so that a little of it throws off the balance of the tallow considerably.

AN AUTOMATIC EVAPORATOR.—Mr. F. E. Ray describes, in the *Pharmaceutical Record*, a very ingenious means of checking the evaporation of a solution at the right movement. He rigs up a kind of a balance of which one pan is the empty evaporating dish, the other a tin of sand. He makes this balance; then he lets the evaporating dish down into the sand-bath, and puts so much sand into the opposing tin as corresponds to the quantity he desires to leave in the evaporating dish. When the evaporation has gone to the desired point the dish rises out of the sand-bath, and a string connected with the beam shuts off the gas.

GLASS ENAMELLED STEEL CASKS.—Glass enamelled steel casks are being made in the States for use as filters in glucose and sugar refineries, evaporating tanks for salt works, and other purposes, and to take the place of casks in breweries. They are said to be the finest specimens of enamelled steel work yet produced. The body of the cask is composed of a number of welded steel rings a quarter of an inch thick with right angle flanges at each edge. The heads are stamped from single sheets of steel in a powerful hydraulic press, and the inside is coated with a glass enamel melted into the steel at a high heat. The sections and heads are bolted together with half inch bolts two inches apart, and the flanges are reinforced by continuous steel washers. The casks can be drilled at any point without chipping the enamel, which shows the tenacious union effected between the steel and the enamel.

WEEKLY WAGES.—A Bill introduced by Mr. Fenwick, M.P., requires the wages of every workman engaged by time to be paid in full at least once in each week. When a workman is engaged otherwise than by time, his wages are directed to be paid in full at the expiration of not more than 14 days from the commencement of the employment or from the last payment in full. If a workman thus engaged gives one day's previous notice to the employer that he requires it, at least 75 per cent. of the wages earned by him are to be paid at the expiration of not more than seven days from the commencement of the employment or from the last payment in full. Moreover, on application at the pay office or some convenient place not later than the day previous to the day on which under the Bill his wages are payable, a workman is to be entitled to receive from his employer a "pay note" showing the amount of wages earned. A form is given in the Bill as to the general effect of the contents of a pay note. For contravening the provisions of the Bill an employer is to forfeit from £5. to £10. on the first occasion, and from £10 to £20 for the second offence; and for the third offence, which is regarded as a misdemeanour, the penalty may go up as high as £100. In the term "workman" is included any person who is a labourer, servant in husbandry, journeyman, artificer, handicraftsman, miner, railway servant, or is otherwise engaged in manual labour.

THE PRODUCTION OF IVORY.—There are annually killed by a minimum of 65,000 elephants, yielding a production of a quantity of raw ivory, the selling price of which is some £850,000. This is shipped to various parts of the world—to the American, European, and the Asian markets. A large quantity is, however, by the native princes of Africa, who are very fond of—and, as a very good judges of—ivory. The production out of Africa is insignificant, and India, Ceylon, and Sumatra together produce some 20,000 kilogs. per year. India is the largest consumer of ivory and China is also a good market.

THE SUBSIDENCES IN CHESHIRE.—At the Northwich Local meeting, on the 19th inst., on the question of the opposition given to the Widnes Brine Bill coming up for discussion, it was that Professor Boyd Dawkins, of Manchester, had visited North and had inspected the town, as well as the site of the proposed pumping station at Wincham, with a view to giving a report to the Parliamentary Committee. The result so far had been highly satisfactory, and the Committee considered that the report would prove of great value. It was reported that the Bill would not be before the Committee until the end of April or the beginning of May. A motion of Mr. Maddocks it was resolved to forward all details of the subsidence question to members of Parliament and to the President of the Local Government Board, showing how the people of the district had suffered and the position in which they stood at present, asking for a Royal Commission to inquire fully into the subject.

THE CHESHIRE SALT SUPPLY.—The new shaft which has sunk at the Northwich Salt Company's new works to a depth of eighty odd feet, and which is thirteen feet square (being one of the largest in the district), has, it is believed, struck a main flow of brine according to experts who have been to the place. The company has some difficulty in sinking the shaft, owing to meeting with a quicksand twenty feet deep, the result of which was that the shaft will have continued with a tube, but at the bottom of this quicksand the "metal" in immense volumes, and has sprung the shaft a height of forty feet. A powerful pump, with quick action, has been inserted, and Mr. Clarke's intention is to get down as far as possible with cylinders. The flow of brine is such that a great supply is expected. A number of houses have been built for the workmen and more are being erected, so that the place has all the appearance of a successful enterprise.

THE FULLERS' EARTH UNION, LIMITED.—The capital of the new undertaking is £105,125., in 105,000 ordinary shares of £1. each and 125 Founders' shares of £1. each. The directorate is a committee of five, with Mr. Alfred G. D. Moger, J.P., banker, of Bath, as chairman. Among the members of the board is the Right Honourable Lord Kilmorey. The object of the company is to acquire and operate the Fullers' Earth Works in the only two places in which earth is found of a character and under conditions which allow being profitably utilised for commercial purposes, namely, in Surrey, and Bath, Somerset. It has been ascertained on enquiry from the office of the Geological Survey that these are the only two places in which works for digging and preparing the earth are in operation. Fullers' earth is largely used for washing rugs and blankets, carpet worn yarns, woollen and worsted cloths and silk, and other fabrics in the course of manufacture and dyeing. In addition to this use is a great demand for the earth (in a highly powdered and refined condition) for chemical and toilet purposes, and also in various stages of refining oils, tallows, fats and wax, and for numerous other purposes. Although the earth is largely used, not only in the centres of the wool trade in Great Britain and Ireland, but also in France, Prussia, Germany, the United States, India, and the Colonies, practically speaking the supplies are drawn exclusively from the sources mentioned. No less than eleven works will be amalgamated, and these will together form a monopoly in their particular line. As will be seen from the perusal of the details, there can be but little doubt as to the probability of the concern as newly organised and developed.

Market Reports.

TAR AND AMMONIA PRODUCTS.

The benzol market is again a shade weaker than reported last week, and prices, both for 90s and 50/90s may be called 1d. less per gallon. Solvent naphtha still continues in good request, and the home market are being supplied with 90% at 160° at 1s. 7d. per gallon, guaranteed equal to sample. Creosote is moving off at good paying prices, anthracene is still again weaker. Pitch remains as quoted last week, 29s, Garston, and 30s. East coast ports.

In sulphate of ammonia there has been a fair amount of business sellers having met the market at the ruling rates. The lower grades of nitrate do not appear so far to have affected sulphate. The

tle quieter feeling to-day. London quotations have kept £11. 12s. 6d. being the price at Beckton, and £11. 15s. ondon makes. At the other ports business has been fairly at £11. 15s. to £11. 16s. 3d.; Leith and Liverpool to £11. 15s.

METAL MARKET REPORT.

	Last week.		This week.
.....	51/0	.....	51/4
.....	£90 7 6	.....	£90 7 6
per	47 2 6	.....	48 17 6
ter	21 15 0	.....	21 15 0
d	12 7 6	.....	12 12 6
er	43 3/4 d.	.....	43 3/4

COPPER MINING SHARES.

	Last week.		This week.
Tinto	15 1/2 15 3/4	.....	16 16 1/2
on & Barry	6 1/8 6 1/8	.....	6 1/8 6 1/8
rsis	4 1/8 4 1/8	.....	4 1/2 4 1/2
e Copper Co. ..	3 1/8 3 1/8	.....	3 1/2 3 1/2
naqua	1 1/8 2 1/8	.....	1 1/8 2 1/8
iaipo	2 1/8 2 1/8	.....	2 1/8 2 1/8
ulcillo	1 1 1/8	.....	1 1/8 1 1/8
w Quebrada	3/8 3/8	.....	3/8 3/8
iola	2 1/8 2 1/8	.....	2 1/8 2 1/8
opilla	1/3 1/9	.....	1/3 1/9
entella	3d. 9d.	.....	3d. 6d.

SCCELLANEOUS CHEMICAL MARKET.

has been considerable disturbance in all branches of the trade, caused by the irregularities in supply of fuel during the winter. Prices of all products in the alkali trade have been depressed by short supplies, and have not yet given way to any appreciable extent. Caustic soda 70's, for early deliveries is at £11. 10s. per ton f.o.b., and 74 % £12. 5s. per ton. Soda ash is still at 1 1/2 d. to 1 3/4 d. per deg. for ordinary grades. Soda 33. per ton. Salt cake 32s. 6d. to 35s. per ton in bulk. Sulphate of soda is at £5. 7s. 6d. to £5. 10s. per ton on rails for export, but can be bought at easier rates for forward supplies. Sulphate of potash is steady at 5d. Vitriol and muriatic acid remain at late prices. Sulphur weak, and business done in recovered prices. Sicilian 3rds £3. 10s. c.i.f. Sulphate of 26. for prompt delivery. Tin crystals 6 3/4 d. per lb. Lead 10s. 6d. and prices nominally as last week, though re-sales are done. Acetates of lime and acetic acid are quiet, and prices of the shade easier. Potash caustic and carbonate unaltered.

REPORT ON MANURE MATERIAL.

has been a moderate business doing, but mostly for early or late delivery and for limited quantities, manure makers being content to concern themselves about forward supplies. Prices of manure material continue to droop, and phosphate values are barely steady.

There is very little doing in mineral phosphates, except in retail for early or immediate deliveries, and quotations all round have experienced any change during the past few weeks.

We have no fresh business to report in cargoes of River Plate bones. The value we should quote £5. 7s. 6d. for December sailing. We have a fair amount of any fresh business in crushed bones, but £5. 5s. would be accepted for shipments shortly due. Further sales of East of England meal have been made at £5. 10s. ex quay, and that price is good for 200 tons Calcutta arrived at Liverpool. Common bones are worth £5., and £5. 2s. 6d. per ton for immediate delivery ex quay Liverpool, but ahead they can be bought at £4. 10s. per ton less, easier freights being obtainable, and supplies being on the way. For next season we do not see any transactions so far. Nitrate continues very weak in all.

Spot price cannot be quoted over 8s. to 8s. 1 1/2 d. per lb. due cargoes would not fetch over 8s. Prices asked for ship-ment 3d. to 4 1/2 d. per cwt. more, but they don't result in business. Market for dried blood is very dull. There are sellers now of prepared under 11s. per unit, and of River Plate at 10s. 3d. of ammonia, but these prices don't attract buyers in the much cheaper nitrate soda and sulphate ammonia. Ammonite is scarce, and quotation remains 9s. 6d. per unit, in bags, delivered f.o.r. at works.

Phosphates are rather irregular in price, there being quantities in second hands offering. Quotation is nominally

46s. 3d. per ton in bulk, f.o.r. at works, but 1s. 3d. to 2s. 6d. less would be business for a good line.

The strike in Liverpool is still seriously interfering with deliveries of goods from the quay, but there seems now a fair prospect of adjustment of differences.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

The general chemicals market has been considerably excited and quotations feverishly on the rise; but there has been no corresponding bulk of business passed, or anything like it, and it is expected that in the result this excitement will be shown to have been unwarranted. Buyers are only buying what they must buy in the meantime, and with the labour troubles settling down the high level of quotation cannot be long maintained. Sulphate of ammonia has not shared in the prevailing inflation, but on the contrary is a little flatter than it has been, as low as £11. 13s. 9d. having been taken, and no more than £11. 15s. got for some days, despite allegations to the contrary. With the exception of burning oil paraffins are all healthy, and for good scale and wax in the hands of dealers rather more than the association fixtures, as given below, is to be obtained. Calico printing in Scotland is not so badly off for working orders, but the rest of the Scotch dyeing departments are all more or less idle, and have been so since January. Bichromates continue in very poor demand, and dyes and drysalteries generally are as a rule depressed. Scotch bleach quotations are irregular, and ruling lower than the figures lately current for Tyneside deliveries. Chief prices current are:—Soda crystals, 50s. to 52s. 6d., less 2 1/2 % Glasgow; alum in lump £5., less 2 1/2 % Glasgow; borax, English refined £30., and boracic acid, £37. 10s. net Glasgow; soda ash, 1 1/2 d. net Tyne; caustic soda, white, 76°, £13. 70/72°, £11. 60/62° £10., and 60/62° cream, £9., all less 2 1/2 % Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 2s. 6d., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1 1/4 d., net Tyne; saltcake, 30s. to 32s. 6d.; bleaching powder, £5. 12s. to £5. 15s. less 5 % f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6 % to Scotch and English buyers respectively; chlorate of potash, 5d., less 5 % any port; nitrate of soda 8s. 1 1/2 d. to 8s. 3d.; sulphate of ammonia, spot, £11. 13s. 9d. to £11. 15s. f.o.b. Leith; sal-ammoniac, 1st and 2nd white, £37. and £35., less 2 1/2 % any port; sulphate of copper, £26., less 5 % Liverpool; paraffin scale, hard and soft, 2 1/2 d. per lb.; paraffin wax, 120°, semi-refined, 3 3/4 d.; paraffin spirit (naphtha), 8 1/2 d. a gallon; paraffin oil (burning), 6 3/4 d. to 7d. at Glasgow; ditto (lubricating), 86°, £5. 10s. to £6. per ton; 88°, £6. 10s.; and 890/895°, £7. 10s. to £8. Last week's imports of sugar at Greenock were 41,816 bags and 2,908 baskets.

THE LIVERPOOL MINERAL MARKET.

The advance previously reported in our market has been more than continued. Manganese: Arrivals are slow and meagre, and sales are being made for prompt and forward delivery at considerably advanced figures. Magnesite: Stocks of raw lump are very large, both at this side and at the port of shipment; large reductions in price, are, therefore, anticipated; raw ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand): Supplies are scarcely able to compete with the demand; prices, therefore, are very firm—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals this week have been more than the average; but, in consequence of the strike, difficulties have been experienced in delivery, and sales have been made above last quotations, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate) continues easier, chiefly owing to useless competition; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, especially best brands, on account of the increased demand and short supplies; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone easy; ground at £10., and specially selected lump, finest quality, £13. Iron ore in demand at full prices. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in strong demand at 18s. to 24s. Purple ore steady at last quotations. Spanish manganiferous ore selling freely at full prices. Emery-stone: Best brand scarce both for spot and forward delivery; prices stronger. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: More offering, high grades bringing full prices.

Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore firm at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel in good demand at stronger figures. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Steady, prices unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE COPPER MARKET.

Messrs. Harrington and Co.'s last fortnightly copper report, states:—Chili copper charters for first half of March were advised yesterday as 300 tons fine. Price of bars nominal, and exchange 24½d. The total charters since 1st January have been 5,200 tons, against 6,200 tons for the same time last year. Since the issue of our last the market has been quiet, and only a moderate business done, prices for g.m.b.'s varying between £46. 10s. and £47. 15s. cash, and £47. 2s. 6d. to £48. three months. Deliveries have been impeded owing to the strike of dock labourers. Smelters complain of want of orders from home and abroad, and are consequently buying sparingly. We close firm at £47. 6s. 3d. for cash, and £47. 12s. 6d. for three months prompt. The total decrease in stocks during the fortnight is 2,217 tons. Refined and manufactured sorts remain quiet, at £52. 10s. to £53. 10s. for tough, £54. to £55. for b.s., £61. to £62. for strong sheets, £58. to £59. for India sheets, and 6d. per lb. for yellow metal sheets. The present stock of English g.m.b.'s in warehouse, Liverpool and Swansea, is 6,837 tons, against 7,040 tons on the 28th ult., showing a decrease of 203 tons. The sales of furnace materials comprise—At Liverpool: 120/135 tons argentiferous Chili regulus, on private terms; 1,675 tons argentiferous Anaconda matte, on private terms; 250 tons Boston Montana matte, at 10s.; 100 tons argentiferous Montana matte, on private terms; and 200 tons Spanish ore, at 8s. 3d. per unit. At Swansea: 300 tons Spanish ore, to arrive, at 9s. 3d. per unit.

THE TYNE CHEMICAL REPORT.

TUESDAY.

Owing to the settlement of the coal dispute, and the resumption of shipments at Liverpool, the chemical market here is settling down after the past week's excitement. Caustic soda and soda ash have advanced 20s. and 15s. per ton respectively since last week's report. Crystals are slightly higher in price, but bleach is not quite so firm. Quotations are more or less nominal, and very little enquiry for forward business. To-days prices are:—

Caustic soda, 77½, £13. per ton, prompt delivery; bleaching powder, in softwood casks, £5. 15s. to £6. per ton, with 2s. 6d. per ton extra for hardwood casks; soda crystals, £2. 10s. per ton; soda ash 48—52% 1½d. per degree less 2¼%; sulphate of soda, ground, in casks, 42s. 6d. per ton, sulphate in bulk, 32s. 6d. per ton; chlorate of potash 5d. per lb.; recovered sulphur, £4. 5s. per ton; silicate of soda, 140° Tw., £4. per ton; 100° Tw., £3. 7s. 6d. per ton; 75° Tw., £2. 10s. per ton; hyposulphite of soda, in 5—7 cwt. casks, £4. 5s. per ton; in 1 cwt. kegs, £4. 15s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s.

per ton; chloride of barium, £8. per ton; nitrate of baryta, cr £18. 10s.; ground, £19. per ton; sulphide of barium, £5. per ton—all f.o.b. Tyne or f.o.r. makers' works.

Dr. R. Spence Watson's award, in connection with the wages of between Messrs. C. Tennant and Partners, Limited, Hebburn, their workmen, was made known on Saturday last. The wages affected the men employed in the alkali and bleach department only, numbering about 240, and of this number about one-fifth been awarded a slight advance on their old rates, the wages of others remaining unaltered.

There is no change in the price of manufacturing coals this week. Northumberland steam small is quoted 8s. to 8s. 6d. per ton. Durham small 9s. 6d. to 10s. per ton.

Gazette Notices.

First Meetings and Public Examinations.

HARRIS, LEON, Olive-terrace, Plasbet-lane, Upper Park-east, London, varnish colour manufacturer, and oil and glass merchant. April 10th, 33, Carey-Lincoln's Inn-fields; April 24th, 34, Lincoln's Inn-fields, London.

Notices of Dividends.

BISHOP, ALBERT BICKLEY, Atherstone, hat manufacturer. First and final dividend of 2s. 10½d., March 20th, 120, Colmore-row, Birmingham.
EASTWOOD, FRED, Accrington, late of Church, near Accrington, mineral and produce broker, and patent size manufacturer. First and final dividend of 3s. March 29th, Official Receiver's Office, Preston.

New Companies.

ANGLO-CALIFORNIAN PETROLEUM GROUND, LIMITED.—This company registered on the 15th inst., with a capital of £250,000., in £1. shares, to a and work the petroleum wells of Messrs. Lacey and Rowland at Los Angeles, California, U.S.A., and there carried on under style of the "Pueblo Oil Company." The subscribers are:—

W. Buttle, Marden-park, solicitor
C. Watkins, 32, Shardeloes-road, New-cross, clerk
P. S. Tempest, 9, Westeria-road, Lewisham
A. Nisbet, 12, Manor-road, Twickenham, clerk of works
H. Woods, 35, Queen Victoria-street, engineer
A. W. Woods, 16, St. George's-road, Regent's-park, secretary to a company
G. A. Ollard, 15, Bedford-row, solicitor

DURAND ELECTRIC PETROLEUM AND GAS ENGINE AND MANUFACTURING COMPANY, LIMITED.—This company was registered on the 15th inst., with a capital of £100,000., in £5. shares, to acquire the business now carried on at 163, Avenue Victor Hugo, Paris, by Eugene Durand, with all the patents, inventions, contracts connected therewith. The nature of the business to be acquired stated. The first subscribers are:—

J. D. Cahill, 6, Great George-street, Cork
T. B. Wells, 6, Pembroke-square, W.
F. Davies, 22, Davies-street, Berkeley-square
J. Russell, 175, Strand
F. Street, 16, Victory-square, S.E.
C. Furtado, 172, Oakley-square, N.W.
R. E. Pritchett, Rhiewport, Hornsey

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Brick-making Machinery. R. Parry. 3,744. March 10.
Incandescent Gas Lamps. A. Wenzel. 3,767. March 10.
Gas Motor Engines. C. D. Abel. 3,774. March 10.
Photographic Apparatus. W. Langden-Davies. 3,775. March 10.
Improvements relating to Basic Furnaces.—(Complete specification) Pszczolka. 3,782. March 10.
Manufacture of Litharge and of Red Lead. G. Larrouy. 3,786. March 10.
Treatment of Dye-woods and their Extracts. M. G. Lindemann. March 10.
Electrical Terminals. W. Brierley. 3,805. March 11.
Refrigerating Apparatus. F. N. Mackay. 3,806. March 11.
The reduction of Sodium or other Metals. G. A. Jarvis. 3,829. March 11.
Apparatus for Controlling the Admission of Air to Heating Apparatus.—(Complete specification.) W. P. Thompson. 3,831. March 11.
Water-heating Apparatus. R. A. Haggard. 3,834. March 11.
Regulation of Alternating Generators.—(Complete specification.) S. Currie. 3,840. March 11.
Automatic Apparatus for Compensating Variations of Current in Electric Conductors. Siemens Bros. and Co., Limited. 3,841. March 11.
Circuit Breaker for Secondary Currents. Siemens Bros. and Co., Limited. 3,842. March 11.
The Shrinking and Fulling of Felt.—(Complete specification.) H. H. 3,846. March 11.

Elements for Secondary Batteries. J. S. Stevenson. 3,967. March 13.
 Apparatus for Cleansing Wool. H. A. A. Dombrain. 3,971. March 13.
 Brick Kilns. G. Möller. 3,985. March 13.
 Sulphurous Acid and Sulphites. G. Horsley and A. C. Wilson. 3,992.
 March 13.
 Electric Regulators. H. Piper. Fil. 4,000. March 14.
 A Continuous Mechanical Filter. H. Yeomans. 4,005. March 14.
 Manufacture of Alkaline Silicate. A. J. Bout. 4,061. March 14.
 Evaporating and Distilling Apparatus. J. Foster. 4,074. March 14.
 Electric Incandescent Lamps. A. A. Goldston. 4,085. March 14.
 Gas Storage Apparatus. W. T. Walker. 4,087. March 14.
 Pressure Gauges. A. T. Clarkson and J. B. Spurge. 4,037. March 14.
 Blowers and Exhausters. T. P. Richards. 4,042. March 15.
 Safety Devices for High-pressure Electrical Currents. B. M. Drake and
 J. M. Gorham. 4,053. March 15.
 Flushing Apparatus. J. Archer. 4,080. March 15.
 Coupling and Insulating Apparatus for Dynamos. C. J. Barley and H.
 Stevenson. 4,086. March 15.
 Secondary Voltaic Batteries. H. T. Chéswright. 4,087. March 15.
 Hydro-atmospheric Motor. C. Burn. 4,093. March 15.
 The Production of Cyanides from Ferro-cyanides. E. Bergmann. 4,095.
 March 15.

AT

France, 300	300	De Paiva, Norman, & Co.
" 80	80	Seaward Bros.
Germany, 40	325	L. Sutro & Co.
U. S., 80	400	T. M. Duché & Sons
Germany, 12	115	Seaward Bros.
" 20	180	Deutschmann & Co.
" 100	100	Fellows, Morton, & Co.
" 20	140	Dutrulle, Solomon, & Co.
" 300	300	J. Barber & Co.
" 200	200	Barrett, Tagant, & Co.
U. S., 300	1,881	L. Sutro & Co.
" 100	560	Prop's. Scott's Whf.
" 50	300	Pillow, Jones, & Co.
" 165	825	T. M. Duché & Sons
" 95	500	J. Keiller & Sons
" 40	300	Page, Son, & East
Germany, 240	240	L. & I. D. Jt. Co.
U. S., 50	300	Pillow, Jones, & Co.
Guanó—		
Chile, 940 t.	Ang. Cont. Guanó Wks. Agency	
Gutta Percha—		
Holland, 34 c.	Kleinwort, Sons, & Co.	
Germany, 1	Lavington Bros.	
France, 5	Flageolet & Co.	
Horn Piths—		
N. S. Wales, 4 t.	2 c.	Goad, Rigg, & Co.
Isinglass—		
China, 5 pkgs.	W. M. Smith & Sons	
Brazil, 1	Lewis & Peat	
E. Indies, 6 pkgs.	L. & I. D. Jt. Co.	
Brazil, 1	"	
Denmark, 10	"	
E. Indies, 3	"	
Germany, 3	E. Davis & Co.	
Cape, 2	Lewis & Peat	
Manure—		
Phosphate Rock		
U. S., 1,661 t.	Fox, Roy, & Co.	
Aruba, 240	Lawes Manure Co.	
Belgium, 130	D. de Passe & Co.	
France, 135	Anglo Cont. Guanó Wks.	
U. S., 660	Odams, Ltd.	
France, 105	A. Hunter & Co.	
" 30	London Manure Co.	
Belgium, 145	Schofield, White & Co.	
Guernsey, 10	P. Hecker & Co.	
Nitre—		
Chile, 7 762 cubic bgs.	A. Ford & Co.	
" 13,183	W. Montgomery & Co.	
" 14,613	"	
" 14,613	F. Huth & Co.	
" 9,395	Ang. Cont. Guanó Wks. Agency	
Holland, 7 cks.	"	

Naphtha —		
Germany, 21 brls.	Stein Bros.	
Potassium Oxymuriate —		
Belgium, 4230	G. Boor & Co.	
Pyrites —		
Spain, 1,398 t	Societe Commerciale	
Pomaron, 900	Mason & Barry	
Spain, 350	F. C. Hills & Co.	
Potash —		
Holland, 475	R. Morrison & Co.	
Plumbago —		
E. Indies, 681 cks.	L. & I. D. Jt. Co.	
Ceylon, 25 brls.	Doulton & Co.	
" 221	Phredder, Son, & Co.	
" 22 bgs.	W. Dunn & Co.	
Cape, 145 cks.	Prop Chamb. Whf.	
E. Indies, 302 cks.	J. Forsay	
Germany, 14 E	E. & G. Hirsch & Co.	
Ceylon, 155	H. J. Ison	
" 296	L. & I. D. Jt. Co.	
Holland, 17	Brown & Elmalie	
Ceylon, 175	R. G. Hall & Co.	
" 85	Hoare, Wilson, & Co.	
" 128	Marshall & France	
" 201	L. & I. D. Jt. Co.	
Paraffin Wax —		
U. S., 78 brls.	G. H. Frank	
" 67	Mordant Bros.	
" 419	H. Hill & Sons	
" 1,000	J. H. Usmann & Co.	
" 112 cs.	H. Hill & Sons	
Petroleum —		
Russia, 2 brls.	L. & I. D. Jt. Co.	
U. S., 30	Mwl. Dk. Co.	
S. Russia, 407,273 galls.	Aschenheim	
U. S., 250 brls.	H. Hill & Sons	
Germany, 25	T. H. Lee	
U. S., 186	Rose, Wilson, & Co.	
Pearl Ash —		
France, 100 c.	F. W. Berk & Co.	
Potassium Carbonate —		
France, 8 pkgs.	J. A. Reid	
Potassium Bicarbonate —		
Germany, 445	A. & M. Zimmermann	
Holland, 35	"	
Potassium Sulphate —		
Germany, 61 pkgs.	H. Lambert	
" 508	Anglo Conti. Guano	
" 10	Works	
Fredrikstad, 30	B. & F. Wf. Co.	
Potassium Prussiate —		
Germany, 11 pkgs.	A. & M. Zimmermann	
Sodium Acetate —		
France, 4133	A. Zumbek & Co.	
" 75	Prop. Hay's Wf.	
Stearine —		
Holland, 22 cks.	Perkins & Horner	
Germany, 48	W. Balchin	
U. S., 74	Beresford & Co.	
Sodium Nitrate —		
Holland, 474	Kaltenbach & Schmitz	
Saltpetre —		
Germany, 72 cks.	P. Hecker & Co.	
E. Indies, 579 bgs.	W. W. & R.	
Germany, 79 cks.	Johnson & Sons	
" 33 pkgs.	J. Hall & Son	
Sugar of Lead —		
Germany, 33 pkgs.	C. J. Capes & Co.	
Tartaric Acid —		
Holland, 27 pkgs.	B. & F. Wf. Co.	
Germany, 9	O. Andrea & Co.	
" 12	"	
Tartars —		
Italy, 31 pkgs.	B. Jacob & Sons	
" 10	Thames S. Tug Co.	
" 610	Saeger, White, & Co.	
Tar —		
Germany, 2 brls.	Langstaff, Ehrenberg, & Co.	
Ultramarine —		
Belgium, 4 cks.	Leach & Co.	
" 3	"	
Holland, 5	Ohlenschlager Bros.	
Germany, 1	G. Steinhoff	
" 5 cs.	H. Brookes & Co.	
Holland, 4	Seaward Bros.	
" 4	Spies Bros	
Zinc Oxide —		
Holland, 25 cks.	Burrell & Co.	
" 105	M. Ashby	
" 300	Soundy & Son	
U. S., 100	M. Ashby	
Germany, 80	J. Matton	
Zinc Sulphate —		
Germany, 462	Beresford & Co.	

LIVERPOOL

Week ending Mar. 20th.

Antimony Ore —		
Hamburg, 110 bgs.		
Barytes —		
Hamburg, 14 cks.		
Bones —		
Boston, 3 tcs.		
Colon, 1 bx. 1,046 bgs.	A. Dobell & Co.	
Jaffa, 17 t.	J. Jowett & Son	
Beyrout, 201		
Constantinople, 50 t.		
Brimstone —		
Catania, a quantity.		
Borax —		
Antofagasta, 780 bgs.		
Leghorn, 100 cs.		
Boracic Acid —		
Leghorn, 30 cks.	Shropshire Union Co.	
" 12		
Caoutchouc —		
Banana, 14 bgs.	Daumas & Co.	
Old Calabar, 5 cks.	Pickering & Berthoud	
Addah, 2 cks. 11	W. J. Radatz & Co.	
Accra, 1	F. & A. Swanzy	
Winnebuh, 3	C. Lane & Co.	
Salt Pond, 2	Pickering & Berthoud	
" 1	6 Edwards Bros.	
" 1	1 Shaeffer & Co.	
" 2	1 A. Miller & Co.	
" 1	2 Radcliffe & Durant	
" 3	3 T. M. Flood	
" 1	4 A. Miller, Bros., & Co.	
" 1	5 W. Griffiths & Co.	
" 1	5 W. B. M'Iver & Co.	
Cape Coast, 3	Manson & Co.	
" 1	1 L. Hart & Co.	
" 5	5 W. B. M'Iver & Co.	
" 1	1 Havard & Co.	
" 2	2 F. & A. Swanzy	
" 1	1 Radcliffe & Durant	
" 1	1 Hobson & Co.	
" 3	3 W. Griffiths & Co.	
" 4	4 J. Smith	
" 2	2 Koresch & Slolzthy	
" 1	1 W. Lucanor & Co.	
" 1	1 T. E. Tomlinson & Co.	
" 4	4 Edwards Bros.	
" 3	3 W. Duff & Co.	
" 2	2 Bennett Brotherton	
" 4	6 Grimwade Ridley & Co.	
" 1	9 F. & A. Swanzy	
" 1	1 Davies, Robbins, & Co.	
Grand Bassam, 1 brl. 1 bx.	Grimwade, Ridley, & Co.	
" 10	2 bgs. Edwards Bros.	
" 2	2 W. D. Woodin	
" 1	1 M. L. Levin	
" 7	1 M. Ridyard	
" 2	2 Applemheimer Bros	
" 2	2 S. C. Nordlinger	
" 1	1 J. Sladelmann	
" 1 cs. 1	5 Cie Francaise	
Sherbro, 2	Pickering & Berthoud	
Sierra Leone, 1 pn. 43 brls.	Pickering & Berthoud	
" 61	110 3 bts. E. G. Gunnell	
Accra, 1 cs. 1	ck. Hutton & Co.	
" 3	4 M. Herschell & Co.	
" 9	9 Edwards Bros.	
" 27	17 J. P. Werner	
" 17	17 J. J. Fischer & Co.	
Akassa, 399 bgs.		
Bay Beach, 2 cks. 2 cs. 3 brls.	Pickering & Berthoud	
" 11 pns. 6 brls. 3 bxs. 1½ hd.	F. & A. Swanzy	
" 3 cks.	C. Rockmann	
Quittah, 8		
Winnebuh, 1 brl.	C. Lane & Co.	
Cream of Tartar —		
Newhaven, 2 cks.		
Genoa, 8		
Chemicals (otherwise undescribed)		
Gothenburg, 5 bxs.	Bahr, Behrenl, & Ross	
Dyestuffs —		
Extrakt		
Havre, 100 cs 18 cks.	Cunard S. S. Co, Ltd.	

Orchella		
Loanda, 30 brls.	A. Barbosa & Co.	
Lisbon, 87	"	
" 123	"	
Loanda, 15 pkts.	"	
Logwood		
Boston, 80 bxs.	B. Wilkinson & Co.	
Valonia		
Constantinople, 579 bgs		
Cochineal		
Teneriffe 4 bgs.	Bruce & Still	
Sumac		
Palermo, 150 bgs.		
Divi Divi		
Maracaibo, 143 t.		
Fustic		
Maracaibo, 77 t.		
Savannilla, 2,030 bgs.	G. H. Muller & Co	
Saffron		
Valencia, 1 cs.		
Glucose —		
Hamburg, 12 cks.		
Iodine —		
Valparaiso, 192 brls.	A. Gibbs & Sons	
Insect Powder —		
Trieste, 6 brls.	G. Pototsching	
" 75		
Manganese Ore —		
Fiunne, 295 t.	H. Borner	
Pitch —		
Amsterdam, 13 cks.		
Pyrites —		
Huelva, 1,595 t.	Matheson & Co.	
" 1,220	Tennants & Co.	
" 1,430	Matheson & Co.	
" 1,412	"	
Potassium Bicarbonate —		
Rotterdam, 8 cks.		
Phosphate —		
St. Valery, 297 t.		
Paraffin Wax —		
New York, 100 brls.	Makin & Bancroft	
Potash —		
Boston, 30 brls.	Makin & Bancroft	
New York, 29	"	
Saltpetre —		
Hamburg, 51 cks.		
" 52		
Stearine —		
Boston, 119 tcs.		
Silica —		
Hamburg, 200 bgs.		
Sodium Nitrate —		
Junin, 8,985 bgs.		
Sulphur —		
Catania, 300 bgs. 50 brls.		
Tar —		
Wilmington, 1,250 brls.		
" 2,733		
Tartar —		
Naples, 2 cks.		
Messina, 8		
Ultramarine —		
Trieste, 50 cs.		
Verdigris —		
Bordeaux, 9 cks.		

GLASGOW.

Week ending March 20th.

Alum —		
Rotterdam, 41 cks.		
Bleaching Powder —		
New York, 100 bxs	McGradie & Christ	
" 110	Hugh Moore & Co.	
Dyestuffs —		
Alizarine		
Rotterdam, 88 cks.	J. Rankine & Son	
" 40		
Logwood		
Jamaica, 629½ t.	Wm. Counal & Co.	
Extracts		
Bordeaux, 100 cs.		
Rouen, 1 ck.		
Rotterdam, 2	J. Rankine & Son	
Madder		
Rotterdam, 2 butts		
Sumac		
Palermo, 5 bla. 1,155 bgs.		
Dyestuffs (otherwise undescribed)		
New York, 6 cs		
Pyrites —		
Huelva, 1,060	Tharsis Co.	
Potash —		
Boston, 32 brls.	Rowley & Dick	
Sodium Nitrate —		
Pisagua, 1,130 t.	Thomson Aikmann	

Saltpetre —		
Rotterdam, 7 cks.	J. Rankine & Son	
Sulphur —		
Palermo, 200 bgs.		
Messina, 50		
Tartar Emetic —		
Hamburg, 2 cs.		
Tartaric Acid —		
Rotterdam, 7 cks.	J. Rankine & Son	
Tartar —		
Bordeaux, 3 cks.	J. & P. Hutch	
Ultramarine —		
Rotterdam, 8 cks.	J. Rankine & Son	

HULL.

Week ending Mar. 20th.

Acids (otherwise undescribed)		
Hamburg, 1 ck.	Bailey & Le	
Rotterdam, 4	G. Lawson & Son	
Barytes —		
Antwerp, 43 cks.	Bailey & Le	
Bremen, 22	T. W. Flint	
" 42		
Borax —		
Danzig, 9 bgs.	Wilson, Sons,	
Bone Meal —		
Kurrachee, 500 bgs.		
Bones —		
Kurrachee, 1,334 bgs.		
Chemicals (otherwise undescribed)		
Hamburg, 20 cks.	Wilson, Sons,	
Antwerp, 15 pkts. 53 brls.		
Rotterdam, 9 cks.	W. & C. L. Ri	
New York, 50	Wilson, Sons,	
Naples, 5		
Genoa, 10		
Bremen, 2	Veltmann	
Danzig, 2		
Dyestuffs —		
Alizarine		
Rotterdam, 3 cks.	W. & C. L. Ri	
" 55 pkgs.	Hutchinson	
" 21		
" 75 cks.	W. & C. L. Ri	
Extracts		
New York, 25 brls.		
Rouen, 21 cks.	Rawson & L	
Madder		
Amsterdam, 1 ck.	W. & C. L. Ri	
Resnet		
Rotterdam, 9		
Copenhagen, 8 pkts.	Wilson, Sons,	
Glucose —		
Hamburg, 15 cks.	Woodhouse	
" 10	Rawson & Ro	
" 25		
" 12	Wilson, Sons,	
Etettin, 100 bgs.		
" 45 cks.		
Hamburg, 18		
Glycerine —		
Hamburg, 5 drums.		
" 5 pkgs.		
Pitch —		
Amsterdam, 13 cks.	H. J. I	
Plumbago —		
Rotterdam, 3 cks.	Johnson	
" 2 cks.		
Phosphate —		
Ghent, 1,204 bgs. 110 t.	Wilson	
" 160 t.		
Potash —		
Rotterdam, 40 cks.	W. & C. L.	
Sulphate —		
Christiania, 100 brls.	Wilson, S	
Stearine —		
Rotterdam, 40 bgs.	Wilson, S	
Tar —		
Marseilles, 24 cks.		
Libau, 131		
Tartaric Acid —		
Rotterdam, 41 cks.	W. & C. L.	
TYNE.		
Week ending Mar. 20th		
Glucose —		
Hamburg, 12 cks.	Tyne S.	
New York, 40 brls.		
Phosphate —		
Antwerp, 140 t.	Langdale's Cl	
" 220		

Sulphur Ore —	
Pomaron, 1,270 t.	Mason & Barry
Saltpetre —	
Hamburg, 7 cks.	Tyne S. S. Co.
Ultramarine —	
Rotterdam, 2 cks.	Tyne S. S. Co.
Zinc Oxide —	
Antwerp, 10 brls.	Tyne S. S. Co.

GOOLE.

Week ending Mar. 12th.

Antimony —	
Ghent, 1 ck.	

Barytes —	
Rotterdam, 12 cks.	
Dyestuffs —	
Alizarine	Rotterdam, 20 brls.
Extracts	Rotterdam, 12 pkgs.
Madder	Rotterdam, 8 cks.
Antwerp, 1	
Dyestuffs (otherwise undescribed)	
Ghent, 84 cks. 55 cs. 3 crbys.	
Glycerine —	
Rotterdam, 21 pkgs.	
Hamburg, 19 cks.	

Glucose —	
Hamburg, 180 bgs.	
Dunkirk, 120	
Phosphate —	
Ghent, 800 bgs.	
Potash —	
Dunkirk, 9 drums	17 cks.
Calais, 13	
Sugar of Lead —	
Hamburg, 10 cks.	
Soda —	
Rotterdam, 10 cks.	
Saltpetre —	
Hamburg, 60 kegs.	

GRIMSBY.

Week ending Mar. 19th.

Albumen —	
Hamburg, 3 cks.	
Caoutchouc —	
Hamburg, 4 pkgs.	
Rotterdam, 1	
Dyestuffs —	
Extracts	Dieppe, 25 pkgs.
Zinc Ashes —	
Antwerp, 15 cks.	

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending Mar. 15th.

Alkali —	
Oporto, 10 c.	£10
Arsenic —	
Sydney, 1 t.	£14
Calcutta, 5	100
Ammonium Sulphate —	
Cologne, 40 t.	£470
Ghent, 50 17 c.	605
" 101 15	1,245
" 30	350
" 30 10	360
Hamburg, 12 5	142
Demerara, 100	1,200
Ghent, 150	1,744
Hamburg, 50 3	570
Berbec, 5	70
Ammonia —	
Huelva, 1 t. 1 c.	£25
Acid (otherwise undescribed)	
Cologne, 300 brls.	£457
Rio Janeiro, 8 cs	37
Acetic Acid —	
Maryboro', 1 t.	£23
Bisulphide of Carbon —	
Rotterdam, 2 t.	£25
Bisulphide of Lime —	
Oporto, 13 c.	£12
Cream of Tartar —	
Townsville, 12 c.	£64
Chemicals (otherwise undescribed)	
Auckland, 3 cs.	£74
Calcutta, 24	285
Bilbao, 89 kegs.	79
Huelva, 5 cs.	22
B. Ayres, 20 pkgs.	43
Sydney, 9 cs.	27
Calcutta, 17 pkgs.	43
Melbourne, 40 kgs.	260
Brisbane, 27 pkgs.	236
Sydney, 70	338
Copper Sulphate —	
Treport, 10 t. 1 c.	£216
Venice, 27 1	778
Trieste, 5	145
Boulogne, 10 2	235
Citric Acid —	
Genoa, 1 t. 5 c.	£186
Brussels, 10	74
Boulogne, 2	15
Lisbon, 11	65
Algoa Bay, 5½	20
Oporto, 4½	27
Seville, 12	84
New York, 1	135
Rotterdam, 6	49
Hamburg, 13	95
Danzic, 3	21
Carbolic Solid —	
Genoa, 14 c.	£48
Caustic Soda —	
Natal, 3 c.	£11
Brisbane, 10	33
Copperas —	
Melbourne, 11 t. 15 c.	£26
Coal Products —	
Tolnole	
Rotterdam, 9 t. 5 c.	£250
Creosote	
Bordeaux, 824 brls.	£450
Naphtha	
Bombay, 250 gls.	£28
Naphthaline	
Treport, 2 c.	£6
New York, 290	135
Hamburg, 61	117

Benzole	
Terneuzen, 29 dms.	
Rotterdam, 32	
Treport, 10 puns.	
Antwerp, 19	
Rotterdam, 48 cks.	
" 19 116 puns.	
Anthracene	
Rotterdam, 117 cks.	
Tar	
Natal, 100 dms.	
Maritzburg, 50 3 rults.	
Braila, 30 cks.	
Ibrail, 75 rults.	
Galatz, 25	
" 100	
Seville, 6 brls.	
Melbourne, 25	
Galatz, 3 cks.	
Bombay, 200 rults.	
Halifax, 50 cks.	
Gothenburg, 50 brls.	
Natal, 60 dms.	
" 20	
Rio Janeiro, 50 rults.	
Natal, 150	
Sydney, 200	
" 100	
Galatz, 75	
Bombay, 27	
Algoa Bay, 25	
St. Michaels, 3 brls.	
Pitch	
Hong Kong, 40 t.	
Dunkirk, 431	
New York, 9 cks.	
Braila, 25	
Galatz, 20	
" 290	
Cette, 829 t.	
Sydney, 10 pkgs.	
Galatz, 35 brls.	
Bombay, 51	
St. Michaels, 6	
Treport, 50 t.	
Dunkirk, 816	
" 172	
Alexandria, 100 brls.	
Salonica, 25	
Dunkirk, 60 t.	
Gijon, 803	

Disinfectants

Havre, 5 cks.	£30
Cape Town, 4 cs.	34
Sydney, 12	71
Paris, 15	49
Antwerp, 3	15
Hamburg, 13 cks.	45

Guano

Genoa, 50 t.	£500
Cherbourg, 20	200
Brest, 630	6,300
Demerara, 50	500

Hydrochloric Acid

Huelva, 18 c.	£14
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Manure

St. Kitts, 60 t.	£630
Havre, 30	115
Ghent, 149	1,788
Hamburg, 244	1,000
Genoa, 10	180
Demerara, 16	50
Havre, 5	75
Colombo, 10	12
Amsterdam, 1	180
Bordeaux, 50	100
Havre, 10	110
Malaga, 10 3 c.	6,640
Rouen, 201	200
Demerara, 20	1,715
Valencia, 221 13	

Demerara, 20	137
Harlingen, 15	60
Antigua, 278 13	1,438
Muriatic Acid —	
Malaga, 4 t. 9 c.	£30
Nitric Acid —	
Jersey, 4 t. 15 c.	£89
Potash Crystals —	
Sydney, 2 cs. 20 cks.	£57
Potassium Chlorate —	
Sydney, 12 t.	£470
Amoy, 7 c.	17
Sydney, 10	421
Phosphate —	
Treport, 10	£75
Potassium Bicarbonate —	
Oporto, 11 c.	£19
Phosphoric Acid —	
Brisbane, 10 t.	£170
Potassium Cyanide —	
Natal, 4 c.	£21
Sheep Dip —	
Hobart, 1,800 gals.	£214
Algoa Bay, 3 t. 15 c.	210
Cape Town, 2 10	133
Wellington, 250 gals.	58
Soda Crystals —	
Sydney, 16 t. 5 c.	£77
Sheep Dip Powder —	
Algoa Bay, 60 cs.	£168
Natal, 320 gls.	75
Algoa Bay, 100 drms. 70 cs.	107
" 55	146
Sodium Tartrate —	
Oporto, 3¼ c.	£14
Brussels, 5½	25
Sodium Sulphate —	
Canaria, 4 t. 4 c.	£54
Saltpetre —	
Gibraltar, 5 t.	£112
Santos, 4 18 c.	110
Seville, 4 9	95
P. Allegre, 19	24
Lisbon, 14 14	316
Melbourne, 1 t. 5 c.	28
Superphosphate —	
Rotterdam, 49 t. 15 c.	£250
Cherbourg, 165 1	495
Canaria, 5 8	27
Superphosphate of Lime —	
Orotava, 7 t. 10 c.	£24
Soda Salts —	
New York, 13 pkgs.	£136
Sulphuric Acid —	
Fremantle, 3 c.	£15
Sydney, 10 cs.	15
Madeira, 10 drms.	£12
Singapore, 3 t. 10 c.	20
Sulphur —	
Fremantle, 2 t. 5 c.	£17
Sugar of Lead —	
Brisbane, 2¼ c.	£4
Sodium Acetate —	
Melbourne, 5 t. 3 c.	£76
Salammoniac —	
Huelva, 12 cs.	£4
Sydney, 2 cks.	22
Sulphur Flowers —	
E. London, 40 kegs.	£17
Tartaric Acid —	
Fremantle, 2¼ c.	£18
Brisbane, 30 pkgs.	178
Madras, 4 cs.	22
Brisbane, 8	48
Sydney, 5 c.	34

LIVERPOOL.

Week ending Mar. 19th.

Alum Cake —	
Calcutta, 4 t. 1 c. 2 q.	
Ammonium Nitrate —	
Port Elizabeth, 16 c.	
Alum —	
Sydney, 2 t.	
Passages, 10 7 c.	
Seville, 8 6	
Magog, 1 3 11 q.	
Galatz, 7 17	
Ammonium Sulphate —	
Las Palmas, 3 t. 6 c. 1 q.	
Valencia, 75 15 2	
Nantes, 62 2	
Ammonium Carbonate —	
Hamburg, 16 c. 2 q.	
Havana, 3	
Odessa, 1 t 2 1	
" 7 10 3	
Antimony Regulus —	
Portland M., 1 t. 16 c. 3 q.	
Alum Sulphate —	
Boston, 2 t. 2 c. 3 q.	
Bleaching Powder —	
Boston, 59 tcs. 266 cks.	
Genoa, 28 11 t. 11	
Hamburg, 73	
San Sebastian, 29	
Hamburg, 5 cs.	
Santander, 13 brls.	
Terneuzen, 25	
Bone Waste —	
Rouen, 8 t.	
Brimstone —	
Santa Catherina, 1 t.	
Laguala Grande, 2 3 c.	
Borax —	
Ibrail, 12 c. 1 q.	
Bilbao, 1 t.	
New York, 7 1	
Adelaide, 1 8 1	
Odessa, 9 14	
Caustic Soda —	
Alicante, 30 dms.	
Amsterdam, 20 brls.	
Antwerp, 18	
Boston, 100	
Brisbane, 45	
Havre, 18	
La Guayra, 24	
Lisbon, 1 cs. 60	
Malaga, 30	
Malta, 20	
Maranham, 10	
Nantes, 35	
New York, 280	
Philadelphia, 100	
Rio Grande do Sul, 100 dms.	
Savanilla, 30	
Seville, 258	
Antwerp, 40 kegs.	
Barcelona, 20 brls.	
Bombay, 18	
Bremerhaven, 5	
Carthagena, 8	
La Guayra, 25	
Lisbon, 16	
New York, 200	
Oporto, 65	
Philadelphia, 230 135 brls.	
Santa Catherina, 20	
Seville, 120 75	
Copperas —	
Halifax, 1 t. 19 c.	
Smyrna, 13 9	
Copper Sulphate —	
Calcutta, 3 t. 15 c.	
" 3 15	

Barcelona,	12	2	255
Bordeaux,	25	16	634
Valencia,	5	5	115
Tarragona,	15		347
Almeria,	2		57
Rouen,	12		300
Tarragona,	5		64
Alicante,	3	18	3
Barcelona,	5	1	2
Bilbao,	41	1	94
Bordeaux,	20	9	3
Bilbao,	9	18	1
Bordeaux,	168	4	4,200
Nantes,	60	1	1,530
Rouen,	147	9	3,771
Valencia,	1	2	20
Hong Kong,	1		30
Genoa,	2	10	1
45			
Carbolic Acid —			
Bilbao,	13	c.	£65
New York,	1	t.	75
Rouen,	1	2	121
Seville,	1	3	12
Hamburg,	19	3	112
Chloride of Lime —			
Alicante,	24	t.	£150
Iquique,	12	c.	10
Calcium Chloride —			
Rouen,	5	t.	£60
Chemicals (otherwise undescribed)			
Guayaquil,	1	c.	£5
New York,	10	t.	64
Havre,	1		9
Colon,	1		30
Caustic Potash —			
Talleres,	3	c.	£5
Citric Acid —			
Batoum,	2	c.	£15
Chlorate —			
Lisbon,	3	c.	£8
Genoa,	1	t.	56
Dried Blood —			
Barcelona,	5	t.	£41
Rio Janeiro,	100	kegs.	
Epsom Salts —			
Rio Janeiro,	100	kegs.	
Iron Oxide —			
Callao,	30	t.	£90
Gijon,	1	4	3
Leghorn,	2	1	1
Philadelphia,	8	15	148
Leather Waste —			
Havre,	9	t.	£72
Manure —			
Bordeaux,	250	t.	£896
St. Nazaire,	350	2	3
Valencia,	75		1,069
Cullera,	148	3	1,080
Magnesia —			
Porto Alegre,	11	cs.	
Carril,	1		
Rio Janeiro,	10		
Magnesium Chloride —			
Bombay,	8	t.	£29
Muriatic Acid —			
Savannah,	4	c.	£2
Oxalic Acid —			
San Francisco,	1	t.	£38
Potassium Chlorate —			
New York,	12	t.	£583
Shanghai,	1	10	77
Yokohama,	5		216
Barcelona,	1		43
Hioho,	2	10	112
Vera Cruz,	1	10	70
Havana,	15		15
Hioho,	2	5	3
Genoa,	1		44
Gothenburg,	5		200
Antwerp,	1		47
Hioho,	7	10	300
Rotterdam,	1	10	59
Potash —			
Monte Video,	1	t.	£55
Phosphate —			
Hamburg,	22	t.	£100
Phosphorous —			
Havana,	7	c.	£115
Vera Cruz,	3	3	40
"	1	t.	115
Potassium Chromate —			
Havre,	6	t.	£185
Potassium Bichromate —			
Marseilles,	1	t.	£49
Sodium Chlorate —			
Antwerp,	10	c.	£28
Sodium Bicarbonate —			
Batoum,	60	kegs.	
Constantinople,	20		
Odessa,	200		
Seville,	20	25	brls.
Valparaiso,	8		

Antwerp,	16	cks.	
Barcelona,	100		
Bremerhaven,	35		
Rotterdam,	20		
Seville,	4		
Sydney,	120		
Sodium Silicate —			
Seville,	50	brls.	
Valencia,	35		
Barcelona,	32	15	brls.
Savannah,			
Soda Ash —			
Baltimore,	282	cks.	
Boston,	115	1,800	bgs.
Corunna,	2		
Melbourne,	451		
New York,	149	731	tc.
Santander,	21	14	brls.
Sydney,	64		
Windsor Mills,		103	tc.
Barcelona,		90	brls.
Buenos Ayres,	175	200	
Hamilton,		90	
Kingsey,		15	
Lisbon,		40	
Monte Video,		50	
New York,	46	260	
Philadelphia,	90		
Porto Alegre,	10		
Rio Grande do Sul,		50	
Salonica,		50	
Sherbrooke,	16		
Tarragona,		20	
Salt —			
Adelaide,	125	t.	
Barbadoes,	50		
Cape Town,	13½		
Cette Cama,	10		
New York,	65		
Para,	107		
Calcutta,	2,710		
Cape Coast,	7½		
New York,	4	9	c.
Opoho,	50		
San Francisco,	200		
Santa Catharina,	15	3	
Port Natal,	45		
Soda Crystals —			
Honolulu,	15	brls.	
Malta,	50		
New York,		140	cks.
St. John's, N B,	20		
Valparaiso,	25		
Constantinople,	50		
Philadelphia,	167		
Santa Catharina,		30	kegs.
Callao,	50		
Sulphur —			
Iquique,	5	t.	£32
Rouen,	15	7	c.
Porto Alegre,	2	t.	£15
Superphosphate —			
Las Palmas,	5	t.	£18
"	8		28
Sodium Biorate —			
Montreal,	1	t.	£34
Yokohama,	3	11	2
Sugar of Lead —			
Calcutta,	5	c.	£6
Spent Oxide —			
Dunkirk,	304	t.	£245
Salammoniac —			
Marseilles,	11	c.	£18
Mersyne,	8		14
New York,	4	t.	163
Gijon,	1	1	3
Syria,	3		5
Sheep Dip —			
Cape Town,	20	cs.	£40
Salt Nitrate —			
Havana,	13	c.	£15
Tar —			
Honolulu,	70	brls.	
Tartaric Acid —			
Havana,	6	c.	£50
Verdigris —			
Rio Janeiro,	1	c.	£11
New York,	3	cks.	58
Zinc Chloride —			
Bombay,	4	t.	£96

TYNE.

Week ending Mar. 20th.

Arsenic —			
Barcelona,	1	t.	5
Bleaching Powder —			
Newfairwater,	14	t.	7
Baltimore,	49	19	
Malmo,	1	16	
Antwerp,	27	17	
Hamburg,	38	22	
Christiania,	4	7	
Aarhus,	1	2	
Philadelphia,	25	4	
Rotterdam,	28	12	
Copenhagen,	7	16	
Libau,	56	15	
Barytes Carbonate —			
Hamburg,	20	t.	
Caustic Soda —			
Newfairwater,	10	t.	3
Baltimore,	203	2	
Antwerp,	4	19	
Philadelphia,	72	10	
Barcelona,	5	16	
Copenhagen,	2	6	
Libau,	29		
Copperas —			
Oporto,	10	t.	10
Litharge —			
Antwerp,	1	t.	14
Hamburg,	2	1	
Magnesia —			
Hamburg,	15	c.	
Barcelona,	11	t.	11
Naphthalene —			
Libau,	25	t.	5
Paraffin Wax —			
Barcelona,	2	t.	1
Phosphorus —			
Malmo,	6	c.	
Barcelona,	16		
Potassium Chlorate —			
Philadelphia,	2	t.	10
Rotterdam,	7	9	
Quinine —			
Barcelona,	7	c.	
Sodium Sulphate —			
Baltimore,	261	t.	14
Copenhagen,	5	5	
Soda Ash —			
Odense,	17	t.	4
Gothenburg,	45	14	
Hamburg,	18	11	
Christiania,	10		
Newfairwater,	9	19	
Savona,	5	19	
Naples,	1	2	
Lisbon,	12	7	
Copenhagen,	13	18	
Sodium Silicate —			
Barcelona,	16	t.	9
Sodium Chlorate —			
Hamburg,	2	t.	10
Rotterdam,	1	2	
Soda —			
Svendborg,	5	t.	
Antwerp,	2	15	c.
Aalborg,	18	11	
Odense,	10	13	
Aarhus,	15	5	
Philadelphia,	301	7	
Kolding,	4	15	
Sodium —			
Hamburg,	1	cs.	
Tar —			
Newfairwater,	33	t.	

HULL.

Week ending March 18th.

Alkali —			
Venice,	50	drums.	
Bleaching Powder —			
Trieste,	2	cks.	
Venice,	39		
Bone Size —			
Harlingen,	30	cks.	
Benzol —			
Hamburg,	14	drms.	
Caustic Soda —			
Bari,	20	cks.	
Libau,	18	drums.	
Chemicals (otherwise undescribed)			
Amsterdam,	40	cks.	
Bremen,	2	cs.	
Bergen,	20	cks.	74
Bordeaux,		20	cs.
Christiania,	14		
Copenhagen,	1		
Gothenburg,	40	13	105
Hamburg,	60	333	11

Libau,	5	100	pkgs.
New York,	50	75	cs.
Rouen,	36		
Rotterdam,		42	35
Stettin,	10		
Trieste,	2		
Venice,	17		
Dyestuffs (otherwise undescribed)			
Bergen,	2	cks.	
Hamburg,	7	1	keg.
Manure —			
Dunkirk,	150	bgs.	
Esbjerg,	800		
Hamburg,	966		
Rouen,	11		
Pitch —			
Antwerp,	130	t.	
Dunkirk,	217		
Tar —			
Christiania,	10	cks.	
Copenhagen,	11		
Hamburg,	1		

GLASGOW.

Week ending Mar. 20th.

Ammonia —			
Trinidad,	7	t.	3½
Ammonium Sulphate —			
Demerara,	68	t.	9
Bone Ash —			
Morlaix,			
Chemicals (otherwise undescribed)			
Melbourne,	24	c.	
Dyestuffs —			
Extracts			
New York,	14½	c.	
Guano —			
Trinidad,	3	t.	
Manganese Oxide —			
New York,	206½	c.	
"	199½		
Potassium Bichromate —			
Rotterdam,	19	cks.	
Antwerp,	309	c.	
Potassium Prussiate —			
New York,			
Sodium Bichromate —			
New York,	325	c.	
Antwerp,	107	t.	
Sodium Phosphate —			
New York,	6	t.	6
Soda Ash —			
Baltimore,	1,317½	c.	
New York,	214½		
Salt —			
Jamaica,	18	t.	18
Tar —			
Constantinople,	1,013	t.	2

GOOLE.

Week ending March 12th.

Benzol —			
Antwerp,	26	cks.	
Ghent,	16	drums.	
Coal Products —			
Antwerp,	23	cks.	
Calais,	25		
Hamburg,	50	8	drums.
Rotterdam,	170		
Chemicals (otherwise undescribed)			
Antwerp,	19	drums.	
Boulogne,	1	ck.	
Ghent,	1		
Hamburg,	44		
Rotterdam,	1		
Dyestuffs (otherwise undescribed)			
Ghent,	7	cks.	
Manure —			
Bruges,	1,441	bgs.	
Dunkirk,	984		
Ghent,	665		
Pitch —			
Antwerp,	193	t.	

GRIMSBY.

Week ending March 15th.

Alkali —			
Antwerp,	8	cks.	
Chemicals (otherwise undescribed)			
Antwerp,	99	cks.	
Dieppe,	2	124	pkgs.
Hamburg,	8		

PRICES CURRENT.

WEDNESDAY, MARCH 26, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
25 % and 40 %	per cwt	7/6	& 12/9
Glacial	"	3	5 0
S.G., 2000°	"	0	12 9
82 %	nett per lb.	0	0 6½
(Tower Salts), 30° Tw.	per bottle	0	0 3¼
(Cylinder), 30° Tw.	"	0	2 11
30° Tw.	per lb.	0	0 1
"	"	0	0 1¼
"	nett	0	0 3¼
"	"	0	1 4
ic (fuming 50 %	per ton	15	10 0
(monohydrate)	"	5	10 0
(Pyrites, 168°)	"	3	2 6
(" 150°)	"	1	8 0
(free from arsenic, 140/145°)	"	1	10 0
ous (solution)	"	2	15 0
(pure)	per lb.	0	1 0½
"	"	0	1 2½
white powdered	per ton	13	10 0
se lump)	"	4	15 0
Sulphate (pure)	"	5	0 0
" (medium qualities)	"	4	10 0
m	per lb.	0	15 0
, 880=28°	per lb.	0	0 3
=24°	"	0	0 1¾
Carbonate	nett	0	0 3½
Muriate	per ton	23	10 0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-
Nitrate	per ton	42	0 0
Phosphate	per lb.	0	0 10½
Sulphate (grey), London	per ton	11	16 3
" (grey), Hull	"	11	15 0
oil (pure)	per lb.	0	0 11¼
alt	"	0	0 9
"	per ton	75	0 0
(tartar emetic)	per lb.	0	1 1
(golden sulphide)	"	0	0 10
chloride	per ton	8	0 0
arbonate (native)	"	3	15 0
ulphate (native levigated)	"	45/-	to 75/-
Powder, 35 %	"	5	7 6
Liquor, 7 %	"	2	10 0
e of Carbon	"	13	0 0
n Acetate (crystal)	per lb.	0	0 6
Chloride	per ton	2	2 6
ay (at Runcorn) in bulk	"	17/6	to 35/-
Dyes :—			
ie (artificial) 20 %	per lb.	0	0 9
a	"	0	3 9
Products			
cene, 30 % A, f.o.b. London	per unit per cwt.	0	1 5
90 % nominal	per gallon	0	3 3
50/90	"	0	2 4
c Acid (crystallised 35°)	per lb.	0	0 10½
" (crude 60°)	per gallon	0	2 9
e (ordinary)	"	0	0 2½
(filtered for Lucigen light)	"	0	0 3
Naphtha 30 % @ 120° C.	"	0	1 5
Oils, 22° Tw.	per ton	3	0 0
f.o.b. Liverpool or Garston	"	1	9 0
Naphtha, 90 % at 160°	per gallon	0	1 11
n Oils (crude)	"	0	0 2½
Chili Bars	per ton	48	10 0
ulphate	"	26	0 0
ide (copper scales)	"	51	0 0
(crude)	"	30	0 0
(distilled S.G. 1250°)	"	55	0 0
"	nett, per oz.	8½	d. to 9d.
hate (copperas)	per ton	1	10 0
hide (antimony slag)	"	2	0 0
et) for cash	"	14	0 0
large Flake (ex ship)	"	15	10 0
ate (white ")	"	23	15 0
" (brown ")	"	18	10 0
bonate (white lead) pure	"	19	0 0
rate	"	22	0 0

	£	s.	d.
Lime, Acetate (brown)	"	8	2 6
" (grey)	per ton	14	0 0
Magnesium (ribbon and wire)	per oz.	0	2 3
" Chloride (ex ship)	per ton	2	6 3
" Carbonate	per cwt.	1	17 6
" Hydrate	"	0	10 0
Sulphate (Epsom Salts)	per ton	3	0 0
Manganese, Sulphate	"	18	0 0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
" Ore, 70 %	per ton	4	10 0
Methylated Spirit, 61° O.P.	per gallon	0	2 2
Naphtha (Wood), Solvent	"	0	3 11
" Miscible, 60° O.P.	"	0	4 7½
Oils :—			
Cotton-seed	per ton	22	10 0
Linseed	"	24	10 0
Lubricating, Scotch, 890°—895°	"	7	5 0
Petroleum, Russian	per gallon	0	0 5¼
" American	"	0	0 5¼
Potassium (metal)	per oz.	0	3 10
" Bichromate	per lb.	0	0 4
" Carbonate, 90% (ex ship)	per ton	18	0 0
" Chlorate	per lb.	0	0 5
" Cyanide, 98%	"	0	2 0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10 0
" (Caustic Potash) 75/80 %	"	21	10 0
" (Caustic Potash) 70/75 %	"	20	15 0
" Nitrate (refined)	per cwt.	1	3 6
" Permanganate	"	4	5 0
" Prussiate Yellow	per lb.	0	0 9½
" Sulphate, 90 %	per ton	9	10 0
" Muriate, 80 %	"	7	15 0
Silver (metal)	per oz.	0	3 7½
" Nitrate	"	0	2 5½
Sodium (metal)	per lb.	0	4 0
" Carb. (refined Soda-ash) 48 %	per ton	6	2 6
" (Caustic Soda-ash) 48 %	"	5	5 0
" (Carb. Soda-ash) 48 %	"	5	10 0
" (Carb. Soda-ash) 58 %	"	6	15 0
" (Soda Crystals)	"	3	0 0
" Acetate (ex-ship)	"	15	15 0
" Arseniate, 45 %	"	10	10 0
" Chlorate	per lb.	0	0 6¼
" Borate (Borax)	nett, per ton	30	0 0
" Bichromate	per lb.	0	0 3
" Hydrate (77 % Caustic Soda)	per ton	13	0 0
" (74 % Caustic Soda)	"	12	0 0
" (70 % Caustic Soda)	"	11	2 6
" (60 % Caustic Soda, white)	"	10	2 6
" (60 % Caustic Soda, cream)	"	9	17 6
" Bicarbonate	"	6	0 0
" Hyposulphite	"	5	5 0
" Manganate, 25%	"	9	0 0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8 1½
" Nitrite, 98 %	per ton	27	10 0
" Phosphate	"	15	15 0
" Prussiate	per lb.	0	0 7¼
" Silicate (glass)	per ton	5	7 6
" (liquid, 100° Tw.)	"	3	17 6
" Stannate, 40 %	per cwt.	2	0 0
" Sulphate (Salt-cake)	per ton	1	12 6
" (Glauber's Salts)	"	1	10 0
" Sulphide	"	7	15 0
" Sulphite	"	5	5 0
Strontium Hydrate, 98 %	"	8	0 0
Sulphocyanide Ammonium, 95 %	per lb.	0	0 8
" Barium, 95 %	"	0	0 5¼
" Potassium	"	0	0 8
Sulphur (Flowers)	per ton	7	10 0
" (Roll Brimstone)	"	6	0 0
" Brimstone : Best Quality	"	4	5 0
Superphosphate of Lime (26 %)	"	2	10 0
Tallow	"	25	10 0
Tin (English Ingots)	"	94	10 0
" Crystals	per lb.	0	0 6¼
Zinc (Spelter)	per ton	21	12 6
" Chloride (solution, 96° Tw.	"	6	0 0

THE CHEMICAL TRADE JOURNAL

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SATURDAY, APRIL 5, 1890.

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Notices.

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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THE MORAL OF THE GAS FRAUDS

THE TIPPING SYSTEM.

A FEW weeks ago the public conscience received a shock from sundry revelations shewing how a noted asbestos company had been accustomed to its business. The said conscience will scarcely have been soothed by what transpired at the Leeds Assizes last week. A more glaring case of commercial immorality has scarcely been brought to light, and though Mr. LEVER received what severe pecuniary chastisement, one cannot help think that, if he has got his deserts, then his sometime colleague HUNTER, is getting a greater punishment than is his lot. But we are not trying to enlist sympathy for either of these men whose iniquities have been so completely brought to light. We simply use the case to point a moral which is to be the tendency of the day to overlook. We are exceedingly loth to breathe a whisper which could be interpreted as a reflection upon the fair fame of the Corporation of Salford, but we cannot help thinking it exceedingly strange that the years covered by the Gas Frauds, they should have been so lamentably ignorant on the subject of the price of gas. One is tempted to wonder if they made their own business contracts in the same happy-go-lucky fashion, and if they allowed their own employes the same latitude that they have about the ruin of the Gas Manager. Is it not highly-timely that Municipal honours should be associated with a little responsibility than has hitherto been the case? Is it much to ask that the men who do us the honour of governing us, should pledge themselves in a something more than a pioneering twaddle to consider our interests as they consider their own? Had some greater measure of responsibility attached to the Corporation of Salford there would have been far less of that speculation, bribery, and corruption than terminated so disastrously for those who indulged in it. The thoughtless shopkeeper who exposes his goods within the reach of the hungry waif and the shoeless stray is generally justly censured; but we are not yet educated up to the point of extending our censure to those who deserve it much more—to those who voluntarily accept offices which they cannot or will not, efficiently perform, though they know perfectly well that their negligence means the wasting of the public money, and the encouragement of trickery and fraud in public service.

It may be urged that our suggestion, if acted upon, would tend to keep many a useful citizen from a seat in the City Chamber, and deprive his fellows of the benefit of his administrative talent. Perhaps so; but its deterrent action will be most strongly marked in the case of those whom the interest of the community to keep out of office, and the public would gain in the long run, even at the cost of the exclusion of a few who would have faithfully discharged the duties of the coveted position.

CHEMICAL ENGINEERING*

XXV.

EXHAUSTING AND COMPRESSING GASES.

GASES are pumped and moved much in the same way as liquids, and there is scarcely any appliance used for pumping or otherwise moving a liquid, that cannot also be employed (with suitable variation on account of difference of density) for aiding the change of motion of a gas. The fan and the centrifugal pump; the pressure blower and the rotary pump; the air compressor and the ordinary force pump; the water injector and the steam jet exhauster are all parallels and the rules that apply to one will also apply to the other.

I think I should commence by describing the ordinary valve compression pump such as may be seen in almost every chemical works, used either for storing up force, for raising fluids, such as vitriol, to the top of denitrating or absorbing columns, or for the supply of air for purely chemical operations, such as the oxidation of manganese protoxide. These are well-known operations in the heavy chemical trade; but there are a multitude of uses to which small compressors are and may be put, in other branches of the industry; not merely as compressors, but as exhausters. And as we shall have to consider this later on, in connection with refrigeration and evaporation it will be as well to thoroughly understand this subject now.

Whatever operation is performed in connection with chemical processes, some attempt should be made to aim at efficiency, and if this can be attained at a reasonable cost there is no reason why it should not be done. There is not much *novus* in selecting an air compressor simply on account of its cheapness, any non-technical man could do that; but it is far more difficult to give one's reason for any definite choice.

PISTON COMPRESSORS.

In pumps of this order there are several points worthy of considerable attention, the most important of which is that the dead space or clearance between the cylinder ends and the piston should be restricted to the narrowest limits. It will be at once seen that in these pumps, the suction valve only lifts when the pressure behind the piston is less than the pressure of the air, and the compressed air in the dead space expands while the piston is receding, and so diminishes the effective capacity of the cylinder. Under ordinary pressures of, say, one atmosphere, or 15 lbs. per square inch, the influence of dead space is not so marked as at pressures of five to ten atmospheres, where the evil effect of clearance becomes very serious.

The next points to consider, are the forms of valves and their proper proportions to the pressures that have to pass through them—I shall not attempt to defend or uphold any of the ordinary valves I have seen working in my practical career; by doing so, I feel sure, I should meet with as many opponents to my views as supporters, and so will content myself with advising every one who finds himself in favour of any particular form, to take an indicator diagram from the compression cylinder, when perhaps he will find his baby is not the most beautiful in the world. The compression of a gas gives rise to the liberation of heat, so that an important feature of most air compressors is the cooling apparatus, and some of my hearers will no doubt have noticed that water is often injected into the compression cylinder to absorb this heat. But in some applications the air is required dry, so that some other system of cooling must be adopted. Most of you will be familiar with the blowing engines made by the Alkali work engineers, Messrs. Daglish, The Widnes Foundry, Messrs. W. Neill and Sons, Messrs. Robinson Cooks, Messrs. Walker Bros., of Wigan, but I am sorry I cannot show you a drawing of one of them.

Fig. 1, however, exhibits the compressor made by Messrs. Scott and Son, of London. The crank shaft, actuated by belt or engine direct, raises the plunger and air through the balanced valve beneath, until it

reaches the upper extremity of its stroke, when it returns and—the bottom valve being now closed—the air in the cylinder is gradually compressed until it fills the lower chamber of the plunger, when, on the next up stroke, delivers the charge now in the inner chamber through the valve in the bottom of the fixed pipe, which also serves as guide, into the receiver or air vessel: now, it will doubtless be apparent that, by proportioning the sizes of the cylinder and the inner chamber of the plunger, an equal load can be put on the up and down strokes, each load for high or low pressures being very moderate; for example, take the cylinder to be 6 in. diameter, and the area = 28 in., and the diameter of the chamber to be $2\frac{1}{2}$ = 4 in. area, or one-seventh the capacity of the large chambers, the air would be compressed in it to 53 lb. per square inch, which would be the pressure exerted at the end of the stroke on the plunger, the load on it would be $28 \times 53 = 1484$ lbs., and the chamber would deliver air through the valve in the pipe at 370 lbs. per square inch, with an equal load; it will be noticed that between the outer thickness of plunger and the wall of the chamber there is an annular space, which is kept supplied with water by two pipes, one for admission and the other exit, which is a most effectual means of keeping down the heat created during compression.

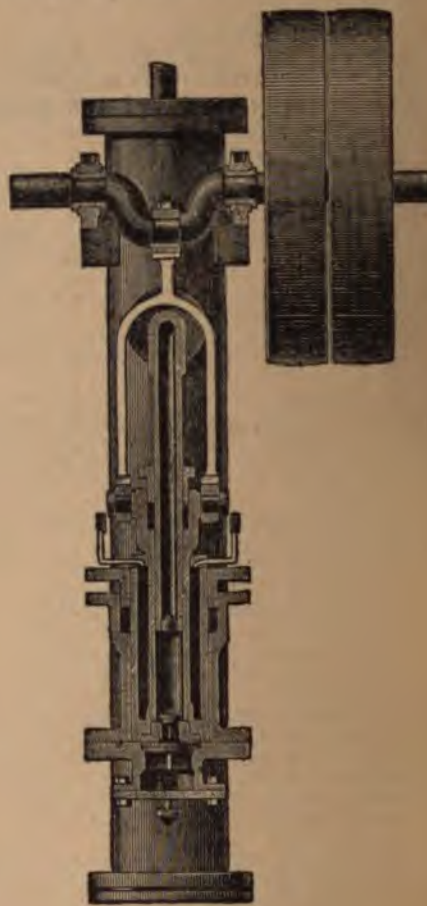


FIG. 1.

A very important feature of this compressor is the absence of clearance already alluded to—a clearance space under the plunger or piston of $\frac{1}{4}$ inch causes a loss of one inch of travel when working to four atmospheres pressure. Professor Wellner, of Brunne, first pointed out the evil effect of clearance space, and he endeavoured to overcome the difficulty, but was not successful, still he led the way for Messrs. Burckhardt and Weiss' improvement and still later the system of Wegelin and Hubner. A compression and evacuation has been very carefully studied by the foreign constructors of sugar boiling appar-

tus and this is a very good illustration of one industry helping another, and no one can have seen these appliances working abroad without coming to the conclusion that our chemical engineering industry would have been leading the van to-day if the engineer had not so often played schoolmaster to the scientist.

Messrs. Wegelin and Hubner's system of building compressors, lies in abolishing the effect of clearance in admitting the air to the cylinder by means of a slide valve, and adding a secondary slide or equalizer which allows the air that is compressed in front of the piston to find its way to the back (suction side) where it is drawn in with the incoming air. When the piston recedes from the suction side, the air pressure is immediately lowered, so that the piston produces suction from the commencement of the stroke.

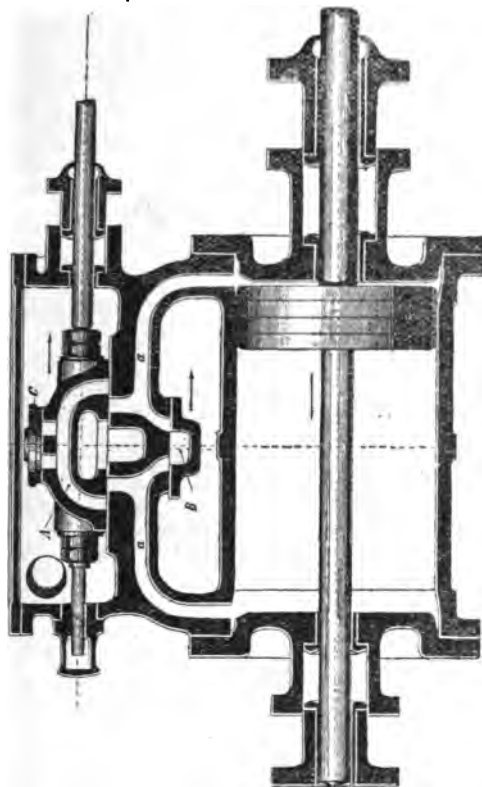


FIG. 2.

The accompanying illustration (Fig. 2.) shows the details of Messrs. Wegelin and Hübner's System. A is the distributing slide valve, for the purpose of letting the air in and out of the cylinder, while B is the equalizing valve uniting the two air passages *aa* just in the right moment, when the piston has arrived at the dead points at the end of each stroke.

If N = effective capacity of cylinder,
 v = pressure of mean suction,
 p = pressure of compression,
 a = proportionate capacity of dead space,

then by the ordinary system, N will equal:—

$$N = \frac{1 - \frac{p}{v} a}{1 - a}$$

and with the equalizer:—

$$N = \frac{1 - \frac{p}{3} \times a^2}{1 - a^2}$$

From these formulæ it will be seen that if the dead space occupies a volume equal to 5 per cent. of the total capacity of the cylinder, the effective capacity with the old-fashioned valves will only be 80 per cent. at pressures of 60 lbs. to the

square inch over the atmosphere, while with the new valves the effective capacity is 98 per cent. The difference is more striking at higher pressures—at 15 atmospheres of absolute pressure the older patterns could only yield a maximum efficiency of 26 per cent. of the total cylinder capacity, while with equalizers the yield would be 96 per cent.

CENTRIFUGAL MACHINES.

Leaving piston pumps, where a moderate volume of gas is required to be delivered at moderate or high pressures, we may turn our attention to those machines where a large volume is required at low pressures, and in this direction I cannot point to a better specimen than the Blackman air propeller, Fig. 3, in which every 10,000 cubic feet of air delivered per minute consumes about one H.P.

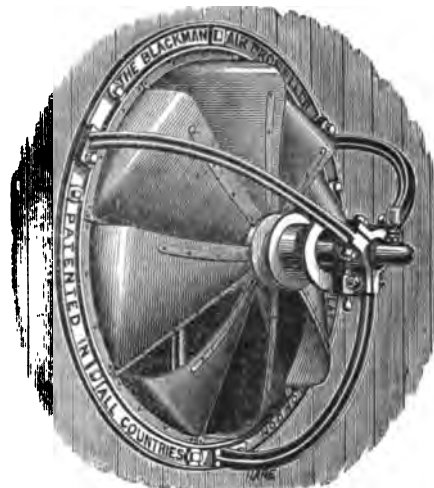


FIG. 3.

In this form of fan a very large volume of air can be set in motion, but there must not be much resistance, still it is a most useful piece of machinery for many chemical purposes. In constructing drying-ovens, stoves, and such like appliances, it is too often forgotten that the rapidity of drying depends in a great measure upon the quick removal of a moisture-laden atmosphere, which can in most cases be done more economically with a fan, than by allowing the moist atmosphere to find its way out of the chamber by simple diffusion. Many instances can be cited where a temperature of 100° C., with a frequent change of atmosphere, would do the work quicker and better than with the apparatus in common use. As an instance, there is the drying of precipitated phosphate of lime; if this substance is overheated, there is a considerable percentage rendered insoluble in citrate of ammonia, and damage of quality sustained thereby, but if the precipitate is dried at 100° C. in a strong current of air, there is scarcely any insoluble in the citrate of ammonia solution.

As before stated, the foregoing form of fan is unsuited for blowing against resistance or pressure; the blades merely impart to the particles of air a momentum corresponding to their velocity, but when resistance occurs the volume delivered is in ratio to that resistance, till a point is reached when the momentum and resistance are equal, when no air whatever is discharged, the fan will continue running absorbing much power, but producing no practical effect.

PRESSURE BLOWERS.

If it is necessary to blow against pressure, other forms must be chosen, these are called pressure blowers. Fig. 4 shows a variety in common use, called Root's blower, in which the two figure of 8 rollers both exhaust and compress the air within the casing during their revolution. They are made both as exhausters and compressors, and are capable of delivering a large volume of air at low pressures. They are employed in chemical works for various purposes, such as exhausting the dilute hydrochloric acid gas from the "Har

salt-cake process, and drawing the gases through bling powder chambers in the "Deacon" process. also used for blowing cupolas where pressures of ounces per square inch only are required. Some e made by a committee of the Franklin Institute in ch will give an idea of the working of this pressure



FIG. 4.

—A Root blower rated to discharge 13.5 cubic feet olution was run at 180 revolutions per minute, and ed 17 ounces pressure per square inch on the guage, no time exceeded 18 ounces, sometimes falling as low ounces, while the pulsation was so great that the became invisible from the rapidity of its movement. ower consumed was 8.43 H.P.

Illustration shown in Fig. 5, is a section of Baker's rotary re blower, much used in blowing cupolas in smelting

It will supply a blast equal to 2 or 3 lbs. per square r produce a corresponding vacuum. The largest size hine yet delivered, I believe, forces 600,000 cubic feet ver hour against a pressure of 3 lbs. per square inch, unning at 100 revolutions per minute.

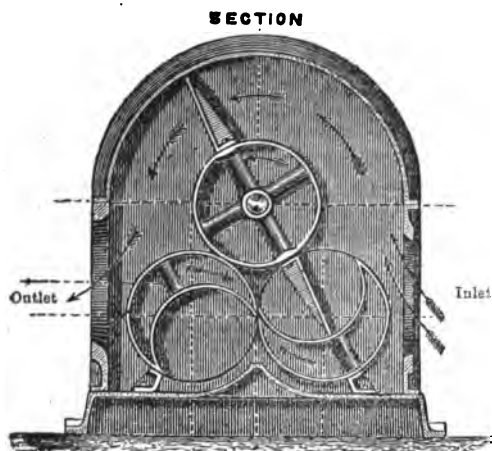


FIG. 5.

influence of resistance, or pressure against even this f blower, may be seen in the experiments carried out Committee of the Franklin Institute. Working under ure of 6 inches of water (say 4 ounces per square inch) er exhaustor of 13 cubic feet displacement capacity s 4½ H.P. to drive it, but in the trials already alluded blast of 12 ounces per square inch consumed 8.13 H.P. le's exhaustor is too well known in the gas industry to e description; in its simplest form, it consists of a r revolving eccentrically within a cast-iron case, and ed with sliding plates placed so that the ends are always tact with the inner surface of the case. The several

makers of this appliance have departed somewhat from the original design, and Fig. 6 shows a section of the modification made by Messrs. Waller and Co., and, with whose workman-ship, I have on several occasions been satisfied. The latest improvement is a revolving drum with four blades, which enter and extend themselves from the periphery during a complete revolution, which may be gathered from an examination of the illustration. I cannot say, off-hand, to what pressure these "exhausters" will work effectively or economically, but I know from experience they will work well to 60 inches of water.

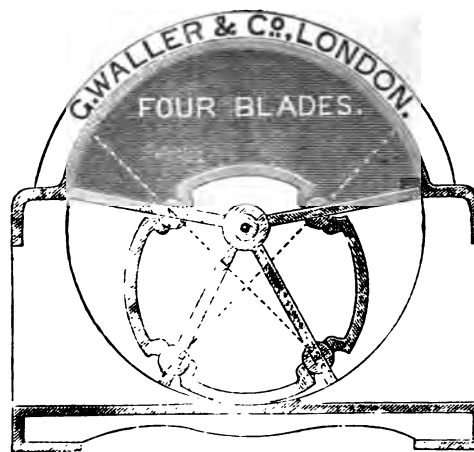


FIG. 6.

Some interesting experiments were made by Mr. C. Woodall, and published in 1877, in the Journal of Gas Lighting, wherein a Beale's exhaustor, made by Messrs. Bryan, Donkin and Co., was driven by a horizontal non-condensing engine, with an expenditure of 2.11 lbs. of coke burned in a Cornish boiler, for every 1,000 cubic feet of gas passed. The vacuum on the inlet to the exhaustor was 3 inches, and the pressure on the outlet, 38 inches. The indicated H.P. exerted, amounted to 0.206 per 1,000 cubic feet.

All the foregoing methods of exhausting or compressing, or forcing gases require the intervention of a motor of some description. The steam jet apparatus, working after the manner of a Giffard injector, requires nothing but a steam pipe; but, of course, the apparatus is not available where the steam has to be kept apart from the gas that has to be moved. To work effectively, they require to be made for each special operation, according to the nature of the gas to be moved, the volume to be passed, the pressure to be overcome, and the working steam pressure; the work to be done may be all exhaustion or forcing only, or a combination of the two; in other words, the business of the apparatus is to overcome the difference of pressure between the inlet and the outlet; and in order to do this effectively, the areas of both steam nozzle and air channel must be very correctly apportioned. When required to produce a vacuum, these appliances should always be designed for the specific conditions: with a working steam pressure of 50 lbs., a vacuum of 24 inches of mercury can easily be obtained, 26 inches being nearly the limit; but, with a higher steam pressure, a larger vacuum may be obtained.

These "ejectors" are largely used for a variety of purposes, such as agitating liquids by drawing air through a perforated pipe or false bottom, exhausting filters, oxidising liquids, exhausting creosote tanks, for vacuum pans in dye-wood extracting, and many other purposes.

Figs. 7, 8, and 9 are different forms of this article made by Messrs. Meldrum Bros., of Manchester. Fig. 7 is an ordinary ejector and Fig. 9 an air compressor. When the work to be done is not known within moderate limits, or varies considerably, the apparatus is supplied with the regulating spindle shown in Fig. 8.

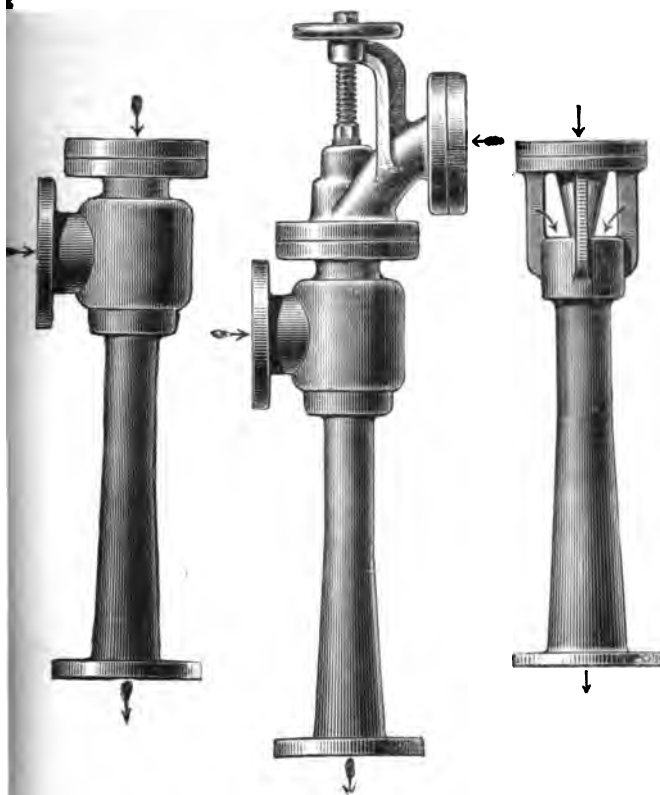


FIG. 7.

FIG. 8.

FIG. 9.

It often becomes necessary to know how much steam passes with the gas during the working of these steam-jet apparatus. Of course, much will depend upon their efficiency; but, with a well-made injector, the following rule will be very near the mark:—

N = cb. ft. gas per hour.

p = counter pressure in ins. water.

S = lbs. steam required.

$$S = \frac{N\sqrt{p}}{55}$$

Which means that 20 lbs. of steam are required for every 1,000 cubic feet of air delivered, when the difference of pressure between inlet and outlet does not exceed two inches of water.

(To be continued)

Our Book Shelf.

LIQUID FUEL FOR MECHANICAL AND INDUSTRIAL PURPOSES, by E. A. BRAYLEY HODGETTS, p.p. 127 and 106 figures in the text. London: E. and F. N. Spow, 1890.

We have here a valuable addition to the literature of fuel. The book does not pretend to bring much that is new before the reader, but rather to gather together the facts that are already known, and to place side by side the results of the most important investigations on the subject. The author gives the average evaporative efficiency of petroleum residual—the particular liquid full mainly referred to—as 7 compared with 4 for coal, but as the difference in price is much more than proportionate we are compelled to agree with him that “not until new oilfields have been discovered, cheaper methods of transport introduced, and oil residuals brought down in price to about double that of coal, will it be possible for them to compete with the latter in Western Europe.” The value of the work would be considerably enhanced by a careful revision of the numerical data as we notice several errors have crept in here.

GLASS COLOURS.

IN the *Diamant*, of Leipzig, an account is given of R. Zsigmon experiments in colouring glass with metallic sulphides, such as molybdenite, and sulphurets of antimony, copper, bismuth, and nickel. Tests made with batches of 10-20 kg., and with a heat not too great gave good results, as follows:—

Sand 65 dekagrammes, potash 15, soda 5, lime 9, molybdenite sulphide of sodium 2, gave a dark reddish-brown ruby glass. Thinner layers this glass appeared light brownish-yellow. Flashed opal, it became a smutty black-brown.

Sand 50 dg., potash 15, soda 5, lime 9, molybdenite 1, sulphurets of sodium 2, gave a yellow glass.

Sand 10 parts, potash 3.3, soda 0.27, lime 1.64, molybdenite 1 gave a reddish-yellow glass with a fine tinge of red.

Sand 100 parts, potash 26, soda 1.8, lime 12, sulphurets of copper 1.7, sulphide of sodium 2.3, gave a dark-brown colour, varying to sepia or sienna. In thick layers it was no longer transparent, but clear and unclouded. When heated, this glass became smutty black-brown and clouded.

A fine copper-red ruby was obtained from a batch of 10 lb. sand, potash 3 lb., lime 1.2 lb., soda 0.25 lb., sulphurets of copper 7.5, sulphide of sodium 10.5 kg., borax 9.5 kg.

The attempts to colour with sulphurets of antimony and bismuth failed. The sulphurets were volatilised, and the resulting glass almost colourless. But the addition of 5 per cent. of sulphurets of nickel to an ordinary batch gave a glass of fine amethyst violet colour.

NEW ANILINE BLACKS.

UNDER the names of NAPHTHOL BLACK 3B and NAPHTHOL LAMINE BLACK D the well-known firm of Cassella and Co. Frankfort, are offering two new specialities.

For dyeing with the former the following process is recommended:—
LIGHT WOOLLEN FABRICS AND YARN: Boil first the goods for half to one hour with 5 to 10% acetic acid of 7 to 8° Tw. or 4 to 6 of tartar, then add the well-dissolved dyestuff and boil from one to two hours according to the quality of the wool.

Shortly before finishing the dyeing operation add 1 to 2% acetic acid in order to exhaust the dye-bath. If feasible lower the temperature of the dye-bath to 140–150° F. before adding the dyestuff, and gradually raise the temperature again to the boil.

COMMON WOOLS may be mordanted with either 2 to 3% muric or 1% sulphuric acid, in place of acetic acid, but acetic acid is always to be used for exhausting the bath.

CLOTH, FELT and such goods generally as are difficult to dye throughout, boil 1 to 2 hours with 5 to 10% acetic acid—muriatic sulphuric acid ought *not* to be used—and then dye as above indicated.

SHADING: For redder shades add Naphthol-Black 4R, brilliant scarlets, amaranth or milling-reds, for blue shades add acid-green naphthol-green or a soluble blue; for deep to dead blacks add Indigo Yellow G.

The contact with metals, ought, wherever this is feasible, to be avoided.

Although the mordanting and dyeing in one bath offers no difficulty it might be found economical to separate the two operations; mordanting bath can then continually be used, and the dyeing can be started at a low temperature without loss of fuel. In this neutralise the alkali in the dyestuff by adding to the dye-bath the weight of acetic acid as of naphthol-black; water containing lime likewise be neutralised with acid.

In the case of Naphthylamine-Black D the best method of application is the following:—

WOOL can be dyed in neutral and in slightly acidulated bath. We recommend for dyeing piece-goods and yarn:—For light shades addition of about 10 grs. of common salt per litre (14 oz. per gallon) water, or 20 grs. of crystallized Glauber's salt; and for darker shades, addition of 5 to 7½ lbs. of acetic acid per 100 lbs. of wool. Loose wool dye adding 5 lbs. of alum and 15 lbs. of calcined Glauber's salt per 100 lbs. of wool. In all cases dye in boiling bath. 3 to 4 of Naphthylamine-Black D produce a full deep shade, which, adding some green, may be turned into a dead black. The dyes are very fast to milling.

SILK dye in boiling bath with addition of some acetic acid or a 7% of dyestuff produce a fine deep black which resists to the action of water and even strong soaping.

MIXED FABRICS (wool and silk) dye in boiling bath with addition of about 6 lbs. acetic acid per 100 lbs. of material. If alum is used in place of acetic acid a deep dead black will be obtained.

NAPHTHYLAMINE-BLACK D does not rub off; it dyes in neutral quite evenly; it is fast to light and milling; these good properties ought to secure for the new dyestuff a large consumption.

Industrial Celebrities.

CHRISTIAN ALLHUSEN.

VIII.

CHRISTIAN ALLHUSEN died on the 13th January of the present year (1890), and his will has been proved during the last few upwards of £1,126,000. personal estate. His father was a man of fortune, a Schleswig-Holsteiner; he resided at Kiel. The armies of Napoleon Buonaparte over-ran Europe they the department of Elbmündungen, and General Davoust made it its Governor. The hardness and cruelty of this man's rule had earned for him the name, "Butcher." He occupied the place of the Allhusens as his head-quarters. Dispossessed of their wealth the family was scattered, and the sons had to seek livelihood by engaging in business.

Young Christian Allhusen obtained an appointment in the office of one of the first firms in the grain trade on the Continent, Koch and Sons, of Rostock. When about nineteen years of age he came across to England to Newcastle-on-Tyne, whither two of his brothers had preceded him, and had obtained employment with Messrs. Campbell and Reveley, who also were grain merchants. Christian Allhusen was admitted into the same office, and remained in the firm until his brothers left to go into business as corn merchants on their own account.

A very short time elapsed before one of the brothers went to London, the other remained in Newcastle took Christian Allhusen's partnership, although he was only nineteen years of age. But this arrangement did not last long, the senior partner left it of the business and leaving Englefield in Nova Scotia.

Christian Allhusen was at Rostock, Messrs. Koch & Sons, the senior clerk of the office was Mr. Bolckow; between the two men an intimate friendship sprang up now when Allhusen was left alone, and led in getting Bolckow to join him. Young men did not confine themselves to grain trade, but struck out as generalists, also creating for themselves a business as ship and insurance brokers, of the firm was "Christian Allhusen and Co."

After a time Allhusen retired from the personal management of the grain trading business, although retaining an interest in it; in later years the firm was known as Christian Allhusen & Co., in addition to Boldman, Borries & Co., afterwards to Borries, Craig, & Co.

As a young man, Allhusen had himself endowed with a spirit of enterprise that had shewn that he possessed the faculties of a financier and business.

In the year 1840 Allhusen discerned the opportunity which the discovery of alkali presented, and although no chemist, and with no experience as a manufacturer, he entered on the industry before which great future was opening. He and Bolckow severed their partnership; the talents of Bolckow were directed to the manufacture of soda; he became the financial partner in the firm of Bolckow, Vaughan & Co., who possessed the technical knowledge and ability, and he practical manager of the works, he having gained his experience in the employ of Messrs. Losh, Wilson, and Bell, at Walker. The same year that Henry Bolckow, John Vaughan, and Joseph Allhusen held their memorable meeting in Pilgrim-street, Newcastle, they formed the resolution to smelt the Cleveland ore at Middlesbrough. Christian Allhusen became the possessor of the small chemical works which Charles Attwood and Co. started in the year 1835. This firm failed to make them a success during the six years they were in operation. From 1840 to 1846 the business was conducted under the title of Allhusen, Turner, and Co.; then it was known as C. Allhusen and Co., and afterwards to C. Allhusen and Co. Limited.

When the Limited Liability Acts were passed, and when the chemical industry was in a prosperous state, this private firm was converted into a joint-stock company, entitled the Newcastle Chemical Works Company, Limited. It was registered on the 30th December, 1871—its capital was £510,000, in 60,000 shares of £8. 10s. each; but in 1873, it was reconstructed, the capital being reduced to £300,000,

being in 60,000 shares of £4. each, and £60,000. in 60,000 preference shares of £1. each, the dividend of the preference shares being cumulative.

This concern has suffered from the general depression which for so many years has rested on the Leblanc soda trade; and, although Christian Allhusen has been the chairman of the company, yet with all his astuteness he has not been able to earn for the ordinary shareholders any dividend since the year 1880, and in that year only 1½ per cent. was paid.

The policy which this firm has pursued in the conduct of their works has been the prompt introduction of improved appliances and new processes; and Christian Allhusen always acted on the principle that whatever was worth doing at all was worth doing well. He prided himself on the perfection with which the plant was constructed; he believed that a niggardly management was an extravagant one.

Surrounded by great engineering industries in which every method that science can suggest to economise labour, and to prevent loss by imperfect combustion is adopted, these Tyneside chemical works were similarly conducted. The engineering skill for which Newcastle is so distinguished, not only contributes to create the position which Newcastle engineers themselves hold, but other industries are greatly assisted and advanced by the scientific and progressive mechanical engineering of that district.

In Allhusen's works the system of working mechanical salt-cake furnaces was first wrought out by Messrs. Jones and Walsh, whose furnace was patented in 1875.



CHRISTIAN ALLHUSEN.

At the present day a very large outlay is being incurred to carry out thoroughly Mr. Chance's process of sulphur recovery from vat waste. Then again, these works have been specially laid out on an extensive scale for the production of caustic soda of high strength. As far as we can judge, this business has not been signalled by any important original discoveries or inventions, but whenever anything new seemed capable of profitable employment it was promptly adopted and effectively carried out. This must be regarded as the principle feature of Allhusen's policy as a manufacturer, to be ever on the lookout for improvements, and never to risk the chance of failure by unwise parsimony in construction.

Although Christian Allhusen remained chairman of the Newcastle Chemical Company until the close of his life, he did not continue to reside in Northumberland, but removed to Stoke Court, Slough, Buckinghamshire. His spirit of enterprise led him to accept positions in connection with undertakings that had their origin in London.

At one time, we find, he was a director of the Royal Aquarium, Westminster, but he does not appear to have found this an object worth sacrificing time and attention to, and his name is only on the list for a short period.

In the north, he connected himself with projects for the supply of water to Newcastle and Gateshead. He promoted the Whittle Dene Water Co. and became a director of the company into which this developed, the Newcastle and Gateshead Water Company; but in London he became a director of the "Brazil Great Southern Railway Co.," "The British Land Mortgage Co. of America," "The International Bank of London," "The New Oriental Bank Corporation," and of the "Grand Hotel," the "Hotel Metropole," and others.

The ability that fitted him to attain to the position of director of these various companies enabled him also to utilise the opportunities that were thus afforded him; he was able to get on the course that led him to the golden goal which he finally attained. It was mainly his financial ability, not his success as a chemical manufacturer, that enabled him to amass the fortune which he left behind him. He appears to have had the genius to discern the right moment and the proper sphere in which to act, and his calmness of judgment and promptness of action earned for him the reputation that everything he touched he turned to gold.

But Christian Allhusen not only had the prescience to discern the flowing of the tide that led on to fortune, he had grasped the principles of political economy. The prime of his life was spent in an active political sphere, for Newcastle has always been a school of strong, vigorous, independent, political opinion. Its sons have been stirring politicians, and have seriously studied with earnest purpose not only home affairs, but the wide field of international and foreign politics. At one time David Urquhart made Newcastle the scene of his agitation; then its voice was heard in the manly, independent

utterances of Joseph Cowen, and to-day it is represented by the man who, whilst he is an accomplished scholar and a famous man of letters, is also the embodiment of philosophical Radicalism.

But not only the place, the time also during which Allhusen lived—especially in his earlier days—was of exceptional interest; it was the day of agitation in favour of the abolition of the Corn Laws, and he was associated with the trade which most of all would be directly affected by any fiscal changes.

He was the contemporary of those great popular agitators, Richard Cobden and John Bright, with whom he was personally acquainted, and he mixed amidst that group of illustrious characters whose names are for ever associated with the great struggle and triumph of Free Trade.

Christian Allhusen became a sound, thorough Free Trader, his clear vision in business enabled him to discern the policy that secures the wealth of nations.

When, in the year 1860, the Cobden Treaty was being negotiated with France the alkali trade of the north was represented by Christian Allhusen, that of Lancashire having selected Mr. E. K. Muspratt to be associated with him.

Mr. Muspratt, recalling those events, says, "We met frequently from 1860 to 1870, when the various commercial treaties were being negotiated, and were together in Vienna, in 1865. I was specially impressed with his great energy and commercial ability, and with the thorough grasp he had of Free Trade principles. He was a thorough Free Trader, and I think we made some impression on the French Government, as the suggested 30 per cent. duty was finally reduced to 10 per cent. He took great interest in every movement in favour of freer commercial intercourse with the Continent of Europe."

As a merchant, who was recognised as a most astute and shrewd man of business, his influence would be considerable, and his opinion carry great weight.

We learn from the *Newcastle Chronicle* that:—"Mr. Allhusen was a large shareholder in the Northumberland and Durham District Bank. When it failed (1857) he propounded a project for certain shareholders to take over the responsibilities of the Consett Iron Works, upon the liquidators of the Bank giving them a guarantee that no call would be made upon the shareholders who did this. The reason for this arrangement was that the iron works had to be carried on, but the liquidators were not in a position to become traders or manufacturers. This daring project, as it was then esteemed, met with a good deal of opposition, but Mr. Allhusen succeeded in inducing the late Mr. R. P. Philipson, Mr. John Benson, and others, to interest themselves in it; and a number of the Bank shareholders took over the works on the condition named. The result justified to the letter all the foresight and business acuteness of Mr. Allhusen. Since its reconstruction there is no enterprise that has been so conspicuously successful in this neighbourhood as the Consett Iron Works."

Were we permitted to enter more minutely into the story of this transaction, we may say it would be a very entertaining and instructive one, and one that would bring out the remarkable astuteness of Christian Allhusen, how well he knew "what he was about."

The following facts may indicate the magnitude and prosperity of this great concern with which Allhusen had so much to do. The Consett Iron Co., Limited, was registered in 1864. The original capital of the Company was £400,000., but it has since been increased at various times (viz. in 1866, 1872, 1880, and 1886) to its present nominal amount of £1,000,000. On the old shares the following dividends have been paid:—

1880-1	..	26½	per cent.
1881-2	..	20	"
1882-3	..	18½	"
1883-4	..	18½	"
1884-5	..	10	"
1885-6	..	10	"
1886-7	..	11½	"
1887-8	..	11½	"
1888-9	..	20	"

The company is connected with another company, the Consett Spanish Ore Co., Limited. The Directorate is almost the same in both companies. The capital of this mining company is £55,200., and the dividends that have been divided are:—

1880-1	..	10	per cent.
1881-2	..	15	"
1882-3	..	15	"
1883-4	..	32½	"
1884-5	..	36½	"
1885-6	..	42½	"
1886-7	..	40	"
1887-8	..	38½	"
1888-9	..	37½	"

Christian Allhusen was at one time president of the Newcastle Chamber of Commerce, he was for some years a member of the Gates-

head Town Council, and was one of the members of the Tyne mission, but his specialty was finance, and commercial enterprise for him an absorbing interest.

During his life in Newcastle, at least from the year 1842, he resided at Elswick Hall. We are indebted to the *Newcastle Journal* for the following information:—"When Allhusen took up his residence in Buckinghamshire, Elswick Hall came into the market, and great efforts were made to induce the Corporation to purchase it, and convert the grounds into a park. At that time the Corporation were not prepared to do anything of the sort, and, in order to prevent the land falling into the hands of the builders, several public-spirited gentlemen bought it, as they put it, in trust for the people, being sure that sooner or later the Town Council would perceive the advisability of a west end and would be convinced of the eminently suitable position of Elswick Hall grounds. In the course of time the Council were educated up to the point, and finally acquired the place, and converted the grounds into the beautiful park which is now the delight of westerners and they found in the hall a capital resting place for the Lough Noble models."

We could have wished that it were a part of our story to tell of the munificence of the successful merchant and manufacturer people of Newcastle would remember his remarkable career by a permanent benefaction, that would have for generations have promoted their health and happiness; but such expressions of a desire to benefit the people do not appear to have been consonant with his views. He is not singular in the opinion, that the man who in pursuit of his personal enrichment, and who with broad and intelligent conception of the science of business seeks his own interest, is a benefactor of his people. His prosperity affords occupation to hundreds of families; his wise expenditure of capital fosters invention; his business becomes a nucleus whence other trades and occupations spring, and a fine street erected on a site, that, by its suitability, attracts other similar works, gives a character to a population and tends to promote the institutions that elevate and enrich social life. Undoubtedly, there is much to be said for such a view, at the same time there is a brightness in acts of benevolence which are prompted by those elementary virtues of sympathy, compassion and goodwill.

It was only as politics were connected with trade that Christian Allhusen took much interest in them publicly. He was the chief mover of a banquet to Mr. Gladstone, at Newcastle, in the year 1868, but this was to celebrate the successful conclusion of the Treaty of Commerce with France, a negotiation in which, as we have already noticed, Allhusen had been one of the delegates of the alkali trade.

In his latter years, when the Irish Question had come to the fore, he very naturally sided with the opinions of those with whom, by his wealth and recognised ability, he had succeeded in becoming associated.

County gentlemen and London financiers, whether plebeian or patrician, have little sympathy with the popular movements of the present day; they dread the socialistic spirit which in one form or another is manifesting itself, and he joined the ranks of the Unionist opposition to the views and policy of Mr. Gladstone.

We can hardly speak of Christian Allhusen as an "Industrial Celebrity;" he has little or nothing in common with Gossage, Deacon, Kurtz or Gamble, Spence or Shanks; these men had made themselves acquainted with chemical science, and they devoted their lives to the application of their knowledge to manufactures; they were inventors, they were engineers, they were trained to direct and manage men, but Allhusen was eminently the man of business, early placed in the counting-house of a great mercantile firm, which proved a scene genial to the earliest development of his gifts and talents: called to the fore before he was of age to direct an independent business, thrown upon his own resources, quickened by the spirit of the times and the conditions by which he was surrounded, and the men with whom he came in contact to great and active enterprise in the pursuit of riches; floated upon the rising tide of a new and lucrative industry; rescued from ruin a business in which he saw possibilities of great prosperity and then seizing the most favourable moment to spread all his sails, he caught the favouring winds of commercial progress and financial development, he reached the haven of opulence and commanding status.

Born in 1806, making money whilst he was in his teens, he favoured with a career of exceptional length and opportunity, at his eighty-fourth year he died a millionaire.

THE BEST KNOWN TEMPERATURES AT THE PRESENT TIME.
Ice melting point, 0° C.; water boiling point, 100° C.; naphthalene boiling point, 218° C.; then, with possible errors of 2°, we have mercury boiling point, 360° C., and sulphur boiling point, 448° C.; with possible errors of 25° C., we have aluminium melting point, 925° C.; and gold melting point, 1,045° C.; and lastly, with possible errors of 50° C., we have palladium melting point, 1,500° C., and platinum melting point, 1,775° C.

IMPORTANT NOTICE.

SPECIAL EXHIBITION NUMBER

OF THE

"CHEMICAL TRADE JOURNAL."

The issue for April 19th will appear as a Special Exhibition Number with a largely increased circulation.

Each Exhibit will receive a detailed notice, descriptive of the goods shewn.

As this number will possess unusual advantages as an advertising medium, it is particularly advisable that application for space should be made as early as possible in order to avoid disappointment.

GLASS BOTTLE INDUSTRY OF THE WORLD.

WHILE it is well known that the manufacture of glass bottles forms an important industry throughout the civilised world its full extent is not generally realised. Following is an estimate of the output per day of glass bottles:—

	Gross per day.
Great Britain and Ireland	6,206
Sweden	960
Norway	600
Denmark	360
Germany and Belgium	30,039
France	100
Austria	7,000
United States	840
Canada	120
Australia	207
Total	46,432

Taking the year at 300 working days, this would make a total output of 13,929,600 gross per year, showing how wide is the field open for this industry. It will be seen that Germany is far in advance of Great Britain in its output, and a considerable portion of the bottles used in England are imported from Germany. It is stated that during the last ten years, prices of bottles have declined on an average about 25 per cent. It is difficult to furnish separate particulars of the imports and exports of glass bottles to and from the United Kingdom, but the following figures from the Board of Trade Returns will give an idea of the importance of the glass trade:

	1887.	1888.	1889.
Imports of Glass.	£	£	£
Window and German sheet, including shades and cylinders	497,313	499,946	453,094
Plate, silvered or not	159,481	200,975	239,562
Manufactures, unenumerated	1,022,112	1,205,404	1,092,667

In the case of the imports the value of the bottles imported is not separated from other articles, but it may safely be assumed that a large proportion of the item of unenumerated manufactures consists of bottles. The Board of Trade returns furnish the following figures of the exports from the United Kingdom:—

	1887.	1888.	1889.
Exports of Glass.	Value.	Value.	Value.
Plate, rough or silvered glass	262,680	260,867	243,991
Flint, of all kinds, and manufactures thereof	236,689	283,674	274,940
Bottles and manufactures of green or non glass	390,585	405,166	464,228
Manufactures, unenumerated	131,075	159,634	164,553
Manufacturer.			

MINING LAWS OF CHILI AND NITRATE PRODUCTION.

THREE consular reports from Her Majesty's representatives in Chili supply valuable information to those interested in the mining industries of that Republic. The latest of the three official communications gives a translation of the new code of mining laws of Chili, which came into operation on January 1st, 1890. Vice-Consul Thomas, writing from Santiago, who has devoted his spare time to rendering into English the Chilean mining code, remarks that the consolidated laws are destined to be of immense importance in the industrial future of Chili, inasmuch as they contain several great advantages over the old laws, in the facilities offered for the establishment of perfect titles to property, without risk of dispute as heretofore. To maintain the legal possession of a mine under the old laws four men had to be constantly employed in it, whether there was work to do or not, and without regard to the owner's ability to support them, either out of his own funds or the produce of the mine. Poorer miners had, therefore, to seek aid to carry out the preliminary works, and maintain the four workmen therein, by ceding a part of their discovery or property, or run the risk of having their claim denounced by unscrupulous parties, only two vigilant in surprising them in that very onerous condition, either to blackmail them, or actually obtain possession of the mine, if it was considered to be a good one. The law courts benefitted by the squabbles, but mines were not profitably worked. Under the new law, in virtue of payment to the Government of an annual licence in March every year, in accordance with the nature of the property, the miner is secured in all his rights irrespective of the number of men he may employ. Mr. Thomas, in a preface to the translated code, says that the reopening of the old and the discoveries of the new gold mines in Chili is shortly going to be the principal mining industry of the Republic. Copper mining has become a precarious business since the collapse of the syndicate and the creation of a keener competition than ever between European and North American producers. Chili, said Don Marcial Martinez, ex-Minister Plenipotentiary and Envoy Extraordinary of the Republic in England, is perhaps the country which possesses the largest number of gold mines and deposits in the world. In the time of the Spanish three-quarters of the gold imported into Spain was sent from Chili. The working of these mines was abandoned when the country became the principal producer of copper, and another reason for their abandonment was because all the gold mines at a certain depth ran into iron pyrites, and with the primitive method of extraction then existing 60 % of the gold was lost in washing the pyrites. The people who work gold mines at present are poor and without the means of applying modern apparatus to the extraction; but whenever it is mentioned that a company is to be formed in Great Britain, the miners, even the very poorest, ask exorbitant prices for their properties. Another difficulty consists in the great distance, which is not easily overcome. It is suggested that, instead of purchasing by option for one year, the buyer should take possession, and work the mine up to the time stipulated for its sale. This explains why gold mines are not worked, although such rich deposits may be found. Syndicates are recommended to send out mining engineers, and these could gain particulars on arrival from local engineers, who would direct them at once to twenty mining centres from Taltal in the north to Tome in the south, where they could inspect for themselves, report, and purchase. Mr. Thomas believes that if this system were carried out the gold of Chili would in one year obtain more universal fame than all its nitrate of soda. The new Mining Code of the Republic of Chili explains how mines of gold, silver, copper, platinum, quicksilver, lead, zinc, bismuth, cobalt, nickel, tin, antimony, arsenic, iron, chromo, manganese, molybdenum, vanadium, rodim, irridium, tungsten, and precious stones, whatever may be the form and origin of their deposits, can be legally acquired. The State reserves to itself the right to work all guano deposits on grounds of any dominion whatsoever, and also the deposits of nitrates and analogous ammoniacal salts, where private mining rights have not been constituted. All loose metals and precious stones found on the surface of the soil belong to its first occupant. The new law contains one hundred and sixty-six Sections, and those who desire further acquaintance with the code should obtain a copy of Parliamentary Return, No. 157, of 1890, in which the text is published. With respect to the nitrate industries of Chili, Consul Newman, of Valparaiso, has forwarded two independent reports to the Marquis of Salisbury, which deals with rise and fall in prices, the limitation of production by combination, the effects of war and earthquakes, and the uncertainties attendant on consumption. Bankers and merchants were alarmed in 1884 at the excessive output, and restriction was agreed upon, on the principle of a percentage on each oficina. The big producers, who could stand to lose, were allowed by the nitrate unionists to enter the ring on their being allowed to produce a larger percentage than their fair share. This

brought in a fresh set of producers, who made money as fast as they could without reference to combinations. This did away with the enforced limit of production. The high price of copper, on the other hand, gave employment to labourers, and there was a dearth of shipping facilities. The following note gives the yearly production of nitrate from 1884 to 1888 inclusive:—

	1884.	1885.	1886.	1887.	1888.
Production.....	550,000	350,000	450,000	700,000	800,000
Average price for cargoes arrived	s. d.	s. d.	s. d.	s. d.	s. d.
March 31.	9 3	9 6	11 1½	10 3	10 3
Do. distant cargoes	9 3	9 9	10 0	8 3	9 0
Freights March 31	32 6	37 6	25 0	32 6	32 6

Among other details furnished by Consul Newman it is stated that the price of a quintal of nitrate on June 3 last, including cost of placing it in bulk, bagging and loading in cars, carriage by rail, export duty of 2s. 4d., port expenses, and shipping clear of surf, was \$2. 46c., against a selling value of \$2. 60c. This calculation takes no account of interest or depreciation. "The business of nitrate production," writes Consul Newman, "is a good honest business, with a sound natural basis, but even for a good thing one may pay too much; besides it has risks inherent to itself beyond the question of supply and demand. The disappointing demand for nitrate on the Continent has, it is believed, been partly the result of the collapse of the Copper Syndicate and Panama Canal Company in France. This tends to hamper banking facilities." There was a demand last year in France and Belgium for nitrate as a fertiliser, especially to beet, and if the Continent took 240,000 tons in 1881-2, and 527,000 tons in 1888-9, there is no reason why the consumption should not go on increasing. Consul Newman throws cold water on companies and over production, but his views have been challenged. The quantities imported into the United Kingdom have not fallen off.

IMPORTS. GREAT BRITAIN AND IRELAND.

	1887.	1888.	1889.
	cwts.	cwts.	cwts.
Nitre Cubic (Nitrate of Soda)	1,736,802	2,053,282	2,351,310

We need only say that British capital has largely been invested in nitrate companies, and consequently we trust that the demand will be sustained. It will be observed that the imports into the United Kingdom in 1889 were 117,565 tons, or considerably less than the imports of France.—*Liverpool Journal of Commerce.*

THE NITRATE MARKET.

COLONEL NORTH presided a few days ago at Winchester House, London, over an ordinary general meeting of the Paccha and Jaz-Pampas Nitrate Company. He stated that the meeting was held in order to comply with the requirements of the law, but they had no report or accounts to submit. He was, however, pleased to see them, because for some time past there had been what was called a panic in nitrate—that was, more nitrate had been produced than it was thought could be consumed. They found now, however, that that was not the case, for over 80,000 tons had been consumed in January and February last in excess of the consumption in the same months of 1889. If the consumption increased at that rate the companies would hardly be able to meet the demand. The low price of nitrate had been to a certain extent the cause of this increased consumption, but he was sure that once a farmer used nitrate he would not care for any other manure. The nitrate companies had been competing against each other in making nitrate and giving it away to the consumer. This had been attended with beneficial results, but the nitrate makers had had enough of it, and all the large companies had formed a company to buy all the nitrate at the price of about 2dol. 70c., instead of 2dol. 25c. or 2dol. 30c. He believed that the arrangement connected with this company would be shortly completed.

DEATH AND BURIAL OF A BANK NOTE.—There is a certain ceremony which attends the death and burial of a Bank of England note. It is only three days after its cancelling that it is carried to its last home in the Bank-note Library. Its first dark day of nothingness is spent in the inspector's office, where severe judges sit in judgment on its virtue. During its second day it and its thirty or forty thousand fellows, done up in parcels, are counted and sorted; that is to say, each parcel is dealt out like a pack of cards, according to dates and denominations of value. The third day they are posted in ledgers, which are kept as indexes to the paid notes; and then, on the evening of their last day in the upper regions of light and air, they are carried down with scant ceremony in huge bags to the Bank-note Library.

BESSEMER PIG IRON IN ENGLAND AND THE UNITED STATES.

THE remarkable situation in the English hematite or Bessemer iron market that we pointed out in an editorial last week is to be even more notable than the figures then at hand justified us stating. Our English Exchanges of two weeks ago show that war were at least 19s. lower than makers' prices. Probably never in history of the English market has there been such a margin between makers' prices and the price of warrants, warrants being 63s. makers' prices 80s. to 82s. This price for warrants is certainly 17 15s. less than the actual cost of production, based on the ruling of raw materials in England.

To produce a ton of pig iron in the West Coast of England requires, 35 cwt. of ore and 22 cwt. of coke. West Coast hematite worth at the mine from 16 to 20 shillings, and Spanish ore is quoted at 16s. 6d. at the port of entry. Taking the average cost at the furnace at 18s. a ton, and coke delivered at 35s. a ton, the cost of Bessemer pig iron at a Cumberland furnace would be about as follows:—

	s.	d.
Ore, 1¼ tons at 18s.	31	6
Coke, 1 1-10 tons at 35s.	38	6
Lime	3	6
Wages, incidentals, etc.	8	6

82 0

This would make the cost of a ton of pig iron in the West Coast or, on the basis of 24.2 cents to the shilling, 19 dols. 84 cents a ton.

Now, how does this compare with the cost of Bessemer pig iron in the United States at the present time? Taking as a basis the costs of ore and coke, which are those we have taken for England, assuming that the cost per unit of iron to make a ton of ore is 12 c and that 94 units of iron and 1 1-10 tons of coke are required to make a ton of pig, we would have the following as the cost of a ton of iron at Pittsburgh at the present time:—

	Dols.
Ore, 94 units at 12 cents	11.28
Coke, 1 1-10 tons at 2 dols. 95 cents.	3.24
Lime	.60
Labour	1.35
Relining	1.25
Incidentals	1.25

17'97

This makes the cost of a ton of Bessemer iron in Pittsburgh at present time, without counting anything for interest, plant, &c., actually 18 dols., about 1'87 dols. less than the price in England.

Analysing the different elements of cost, it will be seen that the cost of ore to a ton of pig in the United States is about 40 per cent. less than in England, while the cost of coke is only about one-third what it is at English furnaces; lime in the United States is less, while labour in the United States is considerably more than it is in England, and incidentals are less.

The cost of English ores and coke are abnormally high, and they may be maintained for a short time, it is more than can be expected by even the most sanguine that they will long remain as are. The action of the speculators in unloading their warrants at prices far below the present price of production, based on the prices of raw material, indicates that they at least do not believe the present rates can be permanently maintained. It is also stated there have not been many orders placed recently for the construction of ships in Great Britain, ship plates being one of the articles into which these hematite irons enter most largely. If this statement is true, it seems evident that there must be in the near future a decline even in the price of makers' irons in Great Britain.—*American Manufacturer.*

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

Business is still in an unsettled state, and prices all round are irregular. Caustic soda is still comparatively scarce for early delivery makers, as a rule, being well filled up with orders. Nearest values are for 70's £10. 10s.—60's £9. 10s. Cream, 60%, £9. 10s.—all f.o.b. Liverpool. Bleaching powder, £5. 10s. per ton rails. Soda ash is at 1¼d. to 1½d. per deg. for ordinary kind rails; high test ash is still very firm at 1½d. per deg. f.o.b. Lancashire and Tyne; soda crystals, £2. 15s. per ton in Lancashire.

potash stationary at 5d. per lb.; sulphur in all grades age; chloride of calcium, 42s. 6d. per ton; vitriol and ds firm at current quotations; chromic acid, 6½ per lb.; copper still very scarce for early deliveries, and spot is £26. 10s. per ton. Forward deliveries easier. rate of lime and other fertilizers are now receiving more usual in view of spring demand. Nitrate of soda, 8s. per te of potash, £7. 15s. to £8 per ton on 80% c.i.f.; lime have been moving more readily at rather easier rates, brown and £13. 15s. for grey, at usual centres of con- Acetates of lead and nitrate of lead continue firm on the large, £15. 15s. net per ton. In potash, caustic, and ere is more demand and a stronger market. Oxalic acid 5d. to 3½d. per lb.; iodine, 8½d. per oz.; white powdered ing freely at £12. 10s. f.o.b. The demand for chemicals e trades is still far from satisfactory, and has a depressing prices of many of the finer chemicals, colours, &c.

THE TYNE CHEMICAL REPORT.

TUESDAY.

Chemical market continues very firm, with good demand for of manufacture. Soda ash has declined in price, but this it might be expected after the sharp advance, in consequence usual temporary demand. Bleaching powder and caustic n unchanged at last week's quotations. Soda crystals very d have advanced 2s. 6d. per ton during the week. f soda in good demand, and prices raised half-a-crown a osulphite of soda has been advanced in price by English manufacturers. Quotations are now 20s. a ton above late

h and Russian shipments are expected to be made in about days for the first time this season. Quotations to-day low:—Caustic soda, 77%, £13. per ton; bleaching softwood casks, £5. 15s. to £6. per ton; soda ash, ¾d. per degree less 2½%; soda crystals, £2. 12s. 6d. ulphate of soda, in bulk, 35s. per ton; ground, in casks, on; chlorate of potash, 5d. per lb.; recovered sulphur, r ton; silicate of soda, 140° Tw., £4. per ton; 100° Tw., l. per ton; 75° Tw., £2. 10s. per ton; hyposulphite of 7 cwt. casks, £5. 5s. per ton; in 1 cwt. kegs, £5. 15s. pure white sulphate of alumina, £4. 10s. per ton; blanc 10s. per ton; chloride of barium, £8. per ton; nitrate of stals, £18. 10s. per ton; ground, £19. per ton; sulphide of 5. 10s. per ton—all f.o.b. Tyne or f.o.r. makers' works.

ham Paper Pulp Company, Limited, which took over the John Smalley, West Hartlepool, for the manufacture of ood pulp, expect to recommence operations in the course ys. The Marsden Chemical Company, Limited, are now ing sulphite wood pulp. Their works are at Marsden, tween South Shields and Sunderland, and their offices at reet, Newcastle-on-Tyne.

no change to report in the price of manufacturing coals. all is quoted 9s. 6d. to 10s. per ton, and Northumberland to 8s. 6d. per ton.

REPORT ON MANURE MATERIAL.

is been a good business passing during the week for all kinds , for prompt or early delivery, the exceptionally fine weather ight orders freely to the manure makers, and they being thus gauge more exactly the balance of their spring requirements

ot hear of any important transactions in mineral phosphates, ons for Charleston are somewhat easier, and a concession of nit would probably have to be made in order to induce much Quotations for Canadian seem to be quite out of reach at present, and we think they will have to be considerably efore, at any rate, the United Kingdom will be tempted to

nothing to report in cargoes of River Plate bones, there ing offering but a December sailing now fully due, and for 7s. 6d. would probably be accepted. There is nothing shed bones to arrive to report, but several parcels arrived at will be offered when landed there, and these will probably be at £5. 5s. ex quay. From the quay 200 tons Calcutta bone ed, sold at £5. 7s. 6d. per ton, which price has repeatedly d for Bombay now in dock at Liverpool. £5. 10s. per ton c quay, and sales have been made at £5. 12s. 6d. per ton, Common grinding bones are worth about £5. per ton, and less may have to be taken, considerable shipments having igher at Liverpool.

Nitrate of soda continues without change. Spot price is 8s. per cwt. for fine quality, and due cargoes cannot be quoted as worth more than 7s. 10½d. per cwt., though 8s. is generally asked.

We have nothing fresh to report in home prepared dried blood, but sales of River Plate on spot and to arrive have been made at 10s. 3d. per unit, which price would be accepted for further parcels arrived in Liverpool.

There is more ammonite now offering, and probably something under 9s. 6d. per unit, in bags, gross weights, delivered f.o.r. at works would be accepted.

The somewhat easier market for superphosphates, indicated in our last report, continues, and value cannot be quoted now at over £2. 3s. 9d. to £2. 5s. per ton, in bulk, f.o.r. at works, there being a considerable quantity in second-hands offering on the market.

Kainit is offering at 38s. to 40s. per ton, according to quantity, net cash, in bags, delivered f.o.r. Birkenhead or Garston.

METAL MARKET REPORT.

	Last week.		This week.
Iron	51/4	....	48/11
Tin	£90 7 6	....	£90 5 0
Copper	48 17 6	....	47 12 6
Spelter	21 5 0	....	21 0 0
Lead	12 12 0	....	12 10 6
Silver	43¾d.	....	43¾

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	16 16½	....	15½ 16
Mason & Barry	6½ 6½	....	6½ 6½
Tharsis	4½ 4½	....	4½ 4½
Cape Copper Co. ..	3½ 3½	....	3½ 3½ x.d.
Namaqua	1½ 2½	....	1½ 2
Copiapo	2½ 2½	....	2½ 2½ x.d.
Panulcillo	1½ 1½	....	1 1½
New Quebrada	¾ ¾	....	¾ 1
Libiola	2½ 2½	....	2½ 2½
Tocopilla	1/3 1/9	....	1/- 1/6
Argentella	3d. 6d.	....	3d. 9d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Matters are settling down slowly after recent uncertainty and excitement, but evidences of a disturbed balance in the market are still plentiful enough. High values in some seem to be giving way; in others they are as yet fully maintained; caustic soda for example having even registered a further slight rise in one of the strengths. Nitrate of soda continues on a very low level, and business has been done without difficulty at 8s., although the nominal quotation is a fraction higher. Sulphate of copper is being done this week 10s. down, and there has also been a further fall in borax, while soda crystals, refined alkali, and soda ash are all easing off a fraction. Sulphate of ammonia also is weaker, a few holders reconciling themselves yesterday to a selling price of £11.12s.6d. spot Leith, while others offer freely at £11.13s.9d. For forward delivery sellers are asking £11. 15s. without inducing more than a very moderate show of business. Paraffins (with the exception of burning oil) are still firm, and for scale and wax the agreement prices are freely obtainable under the new contracts now being entered into. The calls for bichromate of potash and bichromate of soda, of late rather unsatisfactory, have somewhat improved during the week. Chief prices current are:—Soda crystals, 50s. to 52s. 6d., less 2½% Glasgow; alum in lump £5., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¾d. net Tyne; caustic soda, white, 76°, £13., 70/72°, £11., 60/62° £10., and 60/62° cream, £9. 5s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1¾d., net Tyne; saltcake, 30s.; bleaching powder, £5. 10s. to £5. 15s., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 5d., less 5% any port; nitrate of soda 8s. to 8s. 3d.; sulphate of ammonia, spot, £11. 12s. 6d. f.o.b. Leith; salammioniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25. 10s., less 5% Liverpool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¾d. to 7d. at Glasgow for Scotch consumption (English orders done at about 1d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 10s. to £8. Week's imports of sugar at Greenock were 30,255 bags.

TAR AND AMMONIA PRODUCTS.

Benzol values have slightly improved, it being the opinion all round that they will rise higher; 90's have been sold at 3s. 4d., and 50'90's at 2s. 7½d. while solvent naphtha is fetching 1s. 7d. to 1s. 8d. Creosote is firm at old rates and a considerable quantity is changing hands, stocks everywhere being very low. Business in crude carbolic has been done at prices varying from 2s. 6d. to 2s. 8d., makers being very anxious as to the state of the market in the future. Anthracene is still very weak, three months having now passed away since the holders of stocks persuaded themselves that the users must come in, but that event seems as far off as ever, and 1s. 1d. to 1s. 1½d. may be reckoned as today's value of good 30% B, while 1s. 5d. may be safely stated for A quality, in which there is little or no business doing. Pitch is again weaker, and 28s. to 28s. 6d. may be quoted for West Coast shipments, or 29s. 6d. East Coast ports, and perhaps 30s. for London.

The sulphate of ammonia market is in a very peculiar state. There are many who would have us believe that the market has fallen to pieces, but this is not the case, and nearly all the business that has been done at Hull has been £11. 15s. The make to-day is not large, and if the "bear" element would let the market alone it would quickly recover itself, and the Spring demand bring prices to a maximum. As it is, however, no stone is left unturned to depress values, and it is not surprising to find those makers who have but little to sell, holding until the time comes when a rise will be inevitable. The nominal price for Beckton is still £11. 12s. 6d. and though it is reported that £11. 10s. has been accepted at Leith for prompt shipment, it is very doubtful whether this is a *bona fide* transaction. London outside makes are selling at £11. 15s., but without any demand, mainly, no doubt, on account of the Easter holidays, so that normal prices may not be expected from the Continent until after these holidays are over.

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Steady, prices unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23., Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

Our market has continued to advance all round. Manganese: Arrivals are still slow, and sales are being made at advanced figures. Magnesite: Stocks of raw lump are very large, both at this side and at the port of shipment; prices therefore are in the hands of buyers. Raw ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand): Supplies are scarcely able to compete with the demand; prices, therefore, are very firm—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals this week have somewhat increased, but on account of the strike deliveries have been difficult; prices, therefore, are well maintained, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate) continues easier, selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; snalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, especially best brands, on account of the increased demand and short supplies; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone easy; ground at £10., and specially selected lump, finest quality, £13. Iron ore in good demand at full prices. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in strong demand at 18s. to 24s. Purple ore steady at last quotations. Spanish manganiferous ore selling freely at full prices. Emery-stone: Best brands continue scarce both for spot and forward delivery; prices stronger. No. 1 lump is quoted at £5. 10s. to £6., and snalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High grades still inquired for at full prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades,

£14. to £15. Potter's lead ore: Prices are firm; snalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore firm at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel in good demand at stronger figures. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

Gazette Notices.

Partnerships Dissolved.

W. JOHNSON AND R. JOHNSON, Leek, chemists and druggists.

Adjudications.

ARCHIBALD LITTLE, Wandsworth and Mortlake, brick, lime, and cement merchant

New Companies.

FULLERS' EARTH UNION, LIMITED.—This company was registered on the 21st ult., with a capital of £105,125, in £1 shares, to acquire certain Fullers' earth mines and Fullers' earth works, situate at Nutfield, Surrey, and at Bath, and the property held therewith, and certain contracts relating to the supply of Fullers' earth. The first seven subscribers are:—

	Founders' Shares.
A. G. Moger, Bath, solicitor	1
W. Blewitt, Wanstead, solicitor	1
Earl Kilmorey, Carlton Club	1
E. G. Butler, J.P., Combe-hay, Bath	1
C. W. Cawley, Nutfield, managing director	1
Austin J. King, 13, Queen-square, Bath, solicitor	1
R. Le Brasseur, 12, New-court, Lincoln's-inn, solicitor	1

READ, HOLLIDAY AND SONS, LIMITED.—This company was registered on the 24th ult., with a capital of £200,000, in £10 shares, of which 9,000 are 5 per cent. cumulative preference shares, to acquire the business, undertaking, and assets of Read, Holliday and Sons, at Huddersfield, Manchester, and Glasgow, and in New York, Brooklyn, Philadelphia, and Boston, U.S.A., dyers and manufacturers of dyes, colours, chemical substances, &c. An unregistered agreement of the 22nd inst. will be adopted. The subscribers are:—

	Shares.
Thos. Holliday, Huddersfield, chemical manufacturer	1
R. Holliday, Huddersfield, chemical manufacturer	1
W. Heppenstall, Huddersfield, bookkeeper	1
J. Pogson, Huddersfield, traveller	1
Mrs. R. Holliday, Huddersfield	1
G. P. Norton, C.A., Huddersfield	1
E. Cockshaw, Huddersfield, cashier	1

THOMAS AND GREEN, LIMITED.—This company was registered on the 25th ult., with a capital of £39,000, in 200 ordinary and 190 6 per cent. preference shares of £100 each, to take over the business of paper manufacturers, carried on at Woodburn, Bucks., by John Thomas and Roland Green, and in conjunction with such business to manufacture gas and electric power for lighting and other purposes. The subscribers are:—

	Shares.
R. Green, Maidenhead, paper manufacturer	1
Mrs. Green, Maidenhead	1
James Thomas, Bisham, Berks, paper manufacturer	1
Miss E. Thomas, Great Marlow	1
John Thomas, Woodburn, Bucks.	1
Mrs. Thomas, Woodburn, Bucks.	1
Laurence Green, Maidstone, paper manufacturer	1
Herbert Green, Maidstone, paper manufacturer	1

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Electric Arc Lamps. J. Campbell. 4,103. March 17.
Lubricators. A. Bradshaw. 4,107. March 17.
Maturing Spirits and Apparatus therefor. J. McKinless. 4,108. Mar. 17.
Magneto Call Bell Generators. F. J. Young. 4,116. March 17.
Smoke Prevention. J. Shaw. 4,118. March 17.
Rock-boring Apparatus. P. De Baère. 4,119. March 17.
Destructive Distillation of Mineral Oils. J. Laing. 4,120. March 17.
Water Gauges for Steam Boilers. J. McEwen. 4,131. March 17.
Grinding and Amalgamating Pans.—(Complete Specification). W. Roberts and H. R. Belden. 4,133. March 17.
Ozone Oil.—(Complete Specification). F. Piekenbrock. 4,137. March 17.
Water Gauge. H. Glaser. 4,139. March 17.
Treatment of Sewage. F. P. Candy. 4,151. March 19.
Grinding and Mixing Machine. M. H. Simonet. 4,153. March 17.
Apparatus for Concentrating Sulphuric Acid. C. S. Negrier. 4,171. Mar. 17.
Dust Separator. G. H. Oliver. 4,180. March 17.
Ball Socket Electric Switch. F. Suter. 4,189. March 18.
Generating Heat, Steam, and Light by Electricity.—(Complete Specification). T. D. Farrall. 4,191. March 18.

Furnace Grate Bars. G. W. Hawksley. 4,195. March 18.
 The Production of Lighting Gas. H. L. Möller and W. Adkins. 4,197. March 18.
 Smelting Furnaces. T. Teague. 4,201. March 18.
 Mechanical Stokers. John Vicars, Thomas Vicars, and John Vicars the younger. 4,203. March 18.
 Automatic Gas Valve. J. Thomason. 4,208. March 18.
 Apparatus for Charging Inclined Gas Retorts. L. Van Vestrant. 4,217. March 18.
 Removing Paint. A. May. 4,218. March 18.
 Electric Switches. H. C. L. Holden. 4,220. March 18.
 The Production of Water and Generator Gases. J. Von Langer and L. Cooper. 4,223. March 18.
 The Generation and Enrichment of Water and Producer Gases. J. Von Langer and L. Cooper. 4,224. March 18.
 Valves for Hot Gases. J. Von Langer and L. Cooper. 4,225. March 18.
 The Construction of Arc Lamps. W. E. Gray. 4,231. March 18.
 The Construction of Incandescent Electric Lamps. W. E. Gray. 4,232. March 18.
 Filaments for Electric Lamps. J. P. Rees. 4,235. March 18.
 Apparatus for Burning Liquid Fuel. W. E. Smith. 4,236. March 18.
 Disintegrating Machines.—(Complete Specification). J. E. Searles, Junr. 4,241. March 18.
 Grained Smokeless Explosive.—(Complete Specification). W. Schückher. 4,243. March 18.
 Primary Batteries. Sir C. S. Forbes, Bart. 4,246. March 18.
 Apparatus for Purifying and Cooling Water.—(Complete Specification). G. Simpson. 4,251. March 18.
 Apparatus for Sterilizing Milk.—(Complete Specification). P. Jacoby. 4,266. March 18.
 Steam Generators. G. Ingram. 4,268. March 19.
 Photographic Printing. W. W. J. Nicol and J. Lewis. 4,269. March 19.
 Electrical Switches. J. A. Kingdon. 4,275. March 19.
 Wool-Washing Apparatus. H. Smith, E. D. Smith, and H. D. Smith. 4,281. March 19.
 Evaporating and Distilling Apparatus. J. Foster. 4,309. March 19.
 Water Boilers. C. J. Jones. 4,320. March 19.
 Manufacture of Gas. J. A. Keiman. 4,324. March 19.
 Burner for Liquid Fuel. C. A. Sahlström and A. F. Hill. 4,326. March 19.
 Contrivance for Reducing Fluid Pressures. J. Scott and J. Thornton. 4,328. March 20.
 Improved Method of Firing Boilers. R. T. Gillibrand. 4,331. March 20.
 Electric Switches. H. T. Barnett. 4,350. March 20.
 Hydrometers.—(Complete Specification). A. Eichhorn and R. Jasper. 4,354. March 20.
 Carborated Air-Gas. D. Hancock and J. B. Craig. 4,355. March 20.

Pottery Ovens. A. J. Wilkinson. 4,356. March 20.
 Gas Generating Burners. W. G. Robinson. 4,358. March 20.
 Paper-Glazing Machinery. J. Robertson. 4,360. March 20.
 Electrical Thermometers. T. H. Parker. 4,366. March 20.
 Brick-making Machinery. J. S. Pullan, W. H. Mann, and J. Gill. 4,371. March 20.
 Heating Apparatus. F. R. Engeldow and the Engineering Joint Stock Co. 4,374. March 20.
 New Derivatives of Phenyl-amido-acetic Acid. B. Willcox. 4,384. March 20.
 Secondary Batteries. J. Pitkin and H. C. L. Holden. 4,387. March 20.
 Plates for Secondary Batteries. J. Pitkin and H. C. L. Holden. 4,394. March 20.
 Producing Iron from its Ores.—(Complete Specification). J. Von Emswirth. 4,396. March 20.
 Manufacture of Soda by the Ammonia Process. F. Ricard. 4,399. March 20.
 Pulverising Machinery. A. J. Boulle. 4,402. March 20.
 Armatures for Dynamos. W. B. Sayers. 4,405. March 20.
 Dyeing Fast Aniline Black. J. O. Muller and C. O. Weber. 4,409. March 21.
 Extraction of Metals from their Ores. G. T. Beilly and G. G. Henderson. 4,420. March 21.
 Mixture of Steam and other Gases for use in Engines. E. Field. 4,421. March 21.
 Supplying Hot Air to Furnace Flues. J. T. Howson and H. Milnes. 4,423. March 21.
 Producing a Mixture of Steam and other Gases for use in Engines. E. Field. 4,432. March 21.
 Distillation of Ammonia. J. J. Meldrum and T. F. Meldrum. 4,434. March 21.
 Mordanting Cotton Material. W. Turnbull, W. Stockdale, and G. Duff. 4,450. March 21.
 Pumping Apparatus.—(Complete Specification). H. R. Cussons. 4,452. March 21.
 Automatic Fluid Pressure Regulator. H. H. Lake. 4,466. March 21.
 Apparatus for producing Carbonic Acid. H. H. Lake. 4,473. March 21.
 Oil Filter. T. Walton and C. C. Walton. 4,491. March 22.
 Apparatus for Delivering Graduated Quantities of Fluid. R. Bradbury and D. Winterbottom. 4,496. March 22.
 Water-Purifying Apparatus. R. S. Brownlow. 4,500. March 22.
 Brick Kilns. E. P. Lee. 4,504. March 22.
 Production of Potash from Potassium and Magnesium Carbonate. H. Precht. 4,510. March 22.
 High-Pressure Flexible Tubing.—(Complete Specification). H. H. Leitch. 4,529. March 22.
 Self-acting Lubricator for Air Compressors. G. C. Downing. 4,531. March 22.
 Improvements in Evaporating Solutions containing Salts. E. G. Lawrence. 4,532. March 22.
 Safety Devices for Electric Circuits.—(Complete Specification). H. H. Leitch. 4,533. March 22.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending March 25th.

Acetic Acid—

Holland, 134 pkgs. Beresford & Co.
 Germany, 88 A. & M. Zimmermann
 Belgium, 45 Leach & Co.

Alum—

Holland, 427. Ohlenschlager Bros.

Antimony—

Japan, 298 c. H. Rogers, Sons, & Co.
 " 76 H. R. Merton & Co.

Antimony Ore—

France, 9 t. H. Emanuel
 Sydney, 68 Bank of N. S. Wales
 Spain, 20 J. J. Prate & Son

Ammonium Sulphocyanide—

Germany, 144. W. H. Cole & Co.

Barium Chloride—

Germany, 480. Petri Bros.

Brimstone—

Italy, 52 t. P. W. Hore
 " 4 18 c. Typke & King

Barytes—

Germany, 19 cks. Paul & Jantzen
 " 23 O'Hara & Hoar
 " 69 D. Storer & Sons

Bones—

Holland, 20 t. J. Lucey & Sons
 N. S. Wales, 21 t. Hicks, Nash, & Co.
 Spain, 5 t. Culverwell, Brooks, & Co.

Boric Acid—

Germany, 4 pkgs. L. & I. D. Jt. Co.
 Italy, 20 J. Pudy & Co.

Cream Tartar—

Spain, 4 pkgs. L. & I. D. Jt. Co.
 Italy, 38 B. & F. Wf. Co.
 Holland, 38 Middleton & Co.
 " W. C. Bacon & Co.
 " Northcott & Sons
 " W. C. Bacon & Co.

" & F. Wf. Co.
 " Liffé & Gouden

Cobalt Ore—

New Caledonia, 124 t. Newcomb & Son

Caoutchouc—

E. Indies, 33 c. Ross & Deering
 E. Africa, 50 Hammond & Co.
 " 6 1/2 Lewis & Peat
 E. Indies, 11 L. & I. D. Jt. Co.
 Madagascar, 7

" 4 Kebbel, Son, & Co.
 France, 21 1/2 Flageollet & Co.
 France, 118 Kleinwort, Sons, & Co.
 E. Africa, 52 L. & I. D. Jt. Co.
 Germany, 13 1/4 Heilbut, Symons, & Co.

Chemicals (otherwise undescribed)

Germany, 49. T. H. Lee
 " 414 Phillips & Graves
 " 14 L. & I. D. Jt. Co.
 " 97 T. L. Lee
 " 1,130 A. & M. Zimmermann
 " 26 T. H. Lee
 " 15 Phillips & Graves
 " 12 1/2 G. Boor & Co.
 " 705 A. & M. Zimmermann
 " 10 Burgoyne, Burbidge, & Co.
 Holland, 10 W. Boyce

Dyestuffs—

Annatto
 Ceylon, 10 pkgs. Eastern Prod. & Est. Co.
 St. Vincent, 3 bgs. C. Neilson & Sons

Cutch

Holland, 20 pkgs. Brinkmann & Co.

Extracts

France, 70 pkgs. Levinstein & Sons
 Holland, 55 Burt, Boulton, & Co.
 U. S., 12 T. Ronaldson & Co.
 Denmark, 7 Bailey & Leatham
 France, 25 T. H. Lee
 " 251 Prop. Chmblin's Wf.
 U. S., 120 A. J. Humphrey

Orchella

France, 17 pkgs. Hoare, Wilson, & Co.

Indigo

E. Indies, 16 cts. Langstaff & Co.
 " 23 5 bxs. Ross & Deering
 " 68 G. Yule & Co.

E. Indies, 75 cts.

Greytown, 8 Stansbury & Co.
 " 118 Cotesworth & Powell
 " 17 L. & I. D. Jt. Co.

" 1 Cayzer, Irvine, & Co.
 " 20 F. W. Heilgers & Co.
 " 5 Lewis & Peat
 " 160 L. & I. D. Jt. Co.
 " 11 H. Johnson & Sons

Tanners' Bark

Belgium, 14 t. 17 c. H. Henle Succrs
 " 12 S. Barrow & Bro.
 Germany, 10 Baxter & Hoare
 " 20 Bevington & Sons
 " 50 J. Graves

Yellow Berries

France, 30 pkgs. L. & I. D. Jt. Co.

Argols

Italy, 332 pkgs. Thames S. T. Co.
 France, 4 pkgs. D. Magnus

Sumac

Italy, 550 pkgs. J. Kitchen
 " 300 Hicks, Nash, & Co.
 " 200 W. France

Extracts

France, 310 pkgs. Levinstein & Sons

Gutta Percha—

E. Indies, 223 c. Kaltenbach & Schmitz

Guano—

Chile, 1,120 t. Ang. Contl. Guano Wks.

Glycerine—

Holland, 442 F. W. Heilgers & Co.
 Germany, 140 Beresford & Co.
 Holland, 130 1/2 Geelkerken & Co.
 Germany, 130 T. H. Lee
 " 500 Spies, Bros., & Co.

Glucose—

Germany, 400 pkgs. 400 c. L. & I. D. Jt. Co.
 U. S., 10 91 J. H. Epstein
 " 75 450 L. Sutro & Co.

Belgium, 206

Germany, 21 63 J. T. Morton
 U. S., 50 100 Horne & Co.
 " 278 Props. Scott's Whf.

Germany, 25

" 25 216 Leach & Co.
 " 50 205 Pillow, Jones, & Co.
 " 1,200 100 Soundy & Son
 " 25 1,200 R. E. Drummond & Co.
 " 500 208 J. Knill & Co.
 " 50 500 J. F. Ohlmann
 " 450 480 Seaward Bros.
 " 450 498 Union Lighterage Co.

U. S., 20

France, 400 50 J. H. Epstein

Isinglass—

France, 1 pkg. W. H. Mitchell
 B. Guiana, 1 D. Baird & Co.
 B. W. I., 2 W. H. Smith & Sons

Lime Citrate—

France, 100 B. Jacob & Son

Manure—

Phosphate Rock
 Belgium, 160 t. Miller & Johnson
 " 150 London Manure Co.
 " 75 T. Farner & Co.

Nitro—

Chile, 19,168 cubic bgs. W. Montgomerie & Co.
 Bolivia, 11,425 A. Ford & Co.

Naphtha—

Belgium, 12 drs. Domeier & Co.

Potassium Sulphate—

France, 10 pkgs. Carey & Sons

Pitch—

France, 8 brls. Poth, Hille, & Co.
 " 65 Fellows, Morton, & Co.
 Germany, 53 Berlandina, Bros.

Petroleum—

France, 65 brls. H. Hill & Son

U. S., 150 brls.

Rose, Wilson, & Co.
 N. Russia, 40 cks. Burt, Boulton, & Co.
 Holland, 42 drms.

U. S., 50 brls.	Gellatly & Co.
25	J. G. Rollins & Co.
S. Russia, 650	Grosseurth & Luboldt
Paraffin Wax —	
U. S., 100 brls.	G. H. Frank
" 39	H. Hill & Sons
Pearl Ash —	
France, 120 c.	Petri Bros.
Plumbago —	
Holland, 51 cks.	Brown & Elmslie
Potassium Permanganate —	
Germany, 6 pkg.	Spies, Bros., & Co
Sodium Hyposulphate —	
Germany, 38	Beresford & Co.
Sodium Acetate —	
France, 100	Hunter, Waiters, & Co.
Belgium, 84	Leach & Co.
Saltpetre —	
Germany, 79 cks.	J. Hall & Son
" 118	P. Hecker & Co.
Stearine —	
Germany, 186 cks.	W. Balchin
Belgium, 154 bgs.	H. Hill & Sons
France, 10 sks.	Van Geelkerken & Co.
Sugar of Lead —	
Germany, 1 pkg.	C. J. Capes & Co.
Tartaric Acid —	
Holland, 7 pkgs.	B. & F. Wf. Co.
" 4	A. Finsler
Germany, 25	W. C. Bacon & Co.
Tartars —	
Italy, 200 pkgs.	Seager, White, & Co.
Ultramarine —	
Holland, 12 cs.	Ohlenschlager Bros.
" 24 pkgs.	Hernu, Peron, & Co.
Belgium, 4 cks.	G Steinhoff
Germany, 2	"
Holland, 10 pkgs.	Haefner, Hilpert, & Co.
Zinc Oxide —	
Holland, 20 brls.	Beresford & Co.
" 50	M. Ashby
" 300 pkgs.	Soundy & Son
" 140	Hernu, Peron, & Co.

LIVERPOOL

Week ending Mar. 27th.

Antimony Ore —	
Smyrna, 754 bgs.	
Boracic Acid —	
Leghorn, 76 cks.	
Bone Meal —	
Bombay, 968 bgs.	Okell & Owen
Calcutta, 417	Dalzeil & Co.
" 2,986	
Bones —	
Smyrna, 160 t.	
Coquimbo, 6	R. R. Steel & Co.
Constantinople, 45 t.	Barff & Co.
Brimstone —	
Catania, 300 t.	R. Robertson & Co.
Borate of Lime —	
Antofagasta, 719 bgs.	Cockbain, Allardice, & Co.
Copper Regulus —	
Carrizal, 402 t.	Balfour, Williamson, & Co.
Cream of Tartar —	
Bordeaux, 5 cks.	
Genoa, 10	
Barcelona, 1	F. Reid & Co.
Tarragona, 5	
Caoutchouc —	
Ceara, 2 bls	Rosing, Bros., & Co
" 68	
Salt Pond, 1 brl.	W. Griffiths & Co.
Cape Coast, 4 cks.	1 cs. Fletcher & Fraser
" 2	2 A. Millerson & Co.
" 1	Havard & Co.
" 3	T. E. Tomlinson & Co.
" 2	L. Hart & Co.
" 1	Davies, Robbin, & Co.
" 1	F. J. Eaton
" 1	W. Duff & Co.
Axim, 3 bgs.	Radcliffe & Durant
" 2	Edwards Bros.
" 2 brls.	F. & A. Swanzy

Grand Bassam, 3 cks.	A. Verdier
" 3 bgs.	Edwards Bros.
" 1	J. Stradelmann
" 2 brls.	
" 2	Cie de l'Afrique
Sulymah, 3	Palma Tradg. Co.
Sierra Leone, 3	
" 11	Pickering & Berthoud
" 2	Hutton & Co.
" 6	Paterson, Zachonis, & Co.
Bathurst, 4	A. Reis
" 3 cts.	A. Cros & Co.
Colon, 29 brls.	T. M. Williams
Dyestuffs —	
Fustic —	
Vera Cruz, 1,323 ps.	R. B. Watson & Co.
Tampico, 8,184	A. Ugarte
Sumac —	
Palermo, 350 bgs.	100 bls.
Catania, 150	
Palermo, 326	
Extract —	
New York, 100 cs.	
" 6 brls.	J. Singleton
" 42	
St. Nazaire, 150 cks.	
New York, 50 bxs.	Armour & Co.
Antwerp, 7 cs.	J. T. Fletcher & Co.
Valonia —	
Patras, 625 bgs.	C. J. Papayanni & Jeremias
Smyrna, 460	S. Vivante & Son
" 20	S. Spartali & Son
" 155 1/2 t.	
" 205	Barry Bros.
Marathonisi, 107 t.	C. G. Papayanni & Jeremias
Cochineal —	
Grand Canary, 7 bgs.	Lathbury & Co.
" 30	Swanston & Co.
Logwood —	
New York, 50 brls.	
Belize, 169 t.	P. Leckie & Co.
Boston, 100 brls.	10 cs. J. Kenyon & Son
Myrabolams —	
Bombay, 100 bgs.	W. & R. Graham & Co.
Dried Blood —	
Monte Video, 465 bgs.	Merchants Banking Co., London
Glucose —	
Philadelphia, 178 brls.	
New York, 200	
" 20	
Rouen, 5 cks.	Co-op. W'sale Socy., Ltd.
Stettin, 37 cks.	
Hamburg, 5	
Glycerine —	
St. Nazaire, 29 cks.	4 dms.
Venice, 20	
Manure —	
Phosphate Rock —	
Coosaw, 900 t.	
Nitrate —	
Iquique, 12,344 bgs.	
Phosphate —	
Terneuzen, 380 t.	200 bgs. Phospho Guano Co.
Pitch —	
Rouen, 15 cks.	Co-op. W'sale Socy., Ltd.
Potash —	
Rouen, 34 cks.	Co-op. W'sale Socy., Ltd.
Pyrites —	
Huelva, 1,664 t.	Tennants & Co.
Stearine —	
New York, 50 hds.	25 brls.
Antwerp, 13 bgs.	J. T. Fletcher & Co.
" 60	10 cks
Sodium Nitrate —	
Iquique, 9,970 bgs.	W. & J. Lockett
Caleta Buena, 8,334 bgs.	
Sulphur Ore —	
Huelva, 1,639 t.	Matheson & Co.
Saltpetre —	
Calcutta, 665 bgs.	
Hamburg, 83 cks.	
Salt —	
Philadelphia, 65 tcs.	
Hamburg, 102 bgs.	
Sulphur —	
Catania, 30 bgs.	
Tartar —	
Naples, 4 cks.	

Zinc Ashes—
Boston, 11 brls.
Zinc Oxide—
St. Nazaire, 25 brls.

GLASGOW.

Week ending Mar. 27th.

Alum —	
Rotterdam, 42 cks.	
Acetate of Lime —	
New York, 760 bgs.	
Cream of Tartar —	
Marseilles, 5 brls.	1 cs.
Chemicals (otherwise undescribed) —	
Hamburg, 1 cs.	
Dyestuffs —	
Cutch —	
Rangoon, 3,800 cs.	P. Henderson & Co
Sumac —	
Marseilles, 150 bgs.	
Madder —	
Marseilles, 6 brls.	
Rotterdam, 2 cks.	1 box.
Alizarine —	
Rotterdam, 109 cks.	
" 139	
Extracts —	
Antwerp, 2 cks.	
Logwood —	
Old Harbour, 448 t.	M'Arthur, Scott & Co.
Belize, 100 t.	7 c. Allison, Cousland & Co.
Myrabolams —	
Bombay, 667 pkgs.	
Glycerine —	
Marseilles, 10 brls.	A. Steven & Son
Glucose —	
Philadelphia, 180 brls.	
Gutta Percha —	
Amsterdam, 7 bgs.	
Paraffin Wax —	
Rangoon, 364 cs.	P. Henderson & Co.
Potash —	
Rotterdam, 19 cks.	J. Rankine & Son
Potassium Carbonate —	
Hamburg, 55 cks.	
Phosphate —	
Antwerp, 450 t.	
Saltpetre —	
Hamburg, 182 cks.	J. Poynter & Son
Tartaric Acid —	
Bilbao, 16 brls.	
Tar —	
Marseilles, 69 brls.	
Tartar —	
Bordeaux, 4 cks.	J. & P. Hutchinsonson
" 6	
Ultramarine —	
Rotterdam, 3 cs.	4 cks. J. Rankine & Son
Zinc Oxide —	
Marseilles, 368 bgs.	

HULL.

Week ending Mar. 27th.

Acetic Acid —	
Rotterdam, 1 ck.	Hutchinson & Son
" 1	Furley & Co.
" 1 cs.	Hutchinson & Son
" 45 balloons	
Barytes —	
Ghent, 22 cks.	Johnson Bros.
Bremen, 23	Tudor & Son
" 61	Tudor & Son
Chemicals (otherwise undescribed) —	
Hamburg, 6 cs.	Malcolm & Son
Antwerp, 28 brls.	31 pkgs. Wilson, Sons, & Co.
Dunkirk, 326	
Rotterdam, 1 ck.	G. Lawson & Son
" 2 cs.	Hutchinson & Son
Ghent, 20 cks.	W. S. Merrikin
" 39	Sissons Bros. & Co.
Bremen, 5 crbys.	Veltmann & Co.
Dunkirk, 30 drms.	Wilson, Sons, & Co.
" 9 cks.	
Antwerp, 57 pkgs.	"
Dyestuffs —	
Rennet —	
Copenhagen, 1 ck.	3 bxs. Wilson, Sons, & Co.
Extracts —	
Rouen, 171 cks.	Rawson & Robinson
" 70	Wilson, Sons, & Co.

Alizarine —	
Rotterdam, 13 cks.	W. & C
" 14 pks.	
" 76	Hute
" 10	W. & C
Myrabolams —	
Bombay, 9,161 bgs.	
Glucose —	
Hamburg, 600 bgs.	
" 100	A. C. Ho
Copenhagen, 1,200 bgs.	
Hamburg, 15 cks.	Woo
" 12	
Dunkirk, 40 bgs.	
Horn Piths —	
Lisbon, a quantity	Lamt
Manganese Borate —	
Bremen, 1 kg.	J
Manure —	
Kainit —	
Hamburg, 1,016 bgs.	G.
" 660	E
Potash —	
Rotterdam, 32 cks.	
Phosphate —	
Dunkirk, 499 bgs.	
Petroleum —	
New York, 11,834 brls.	
Pitch —	
Libau, 1 brl.	
Stearine —	
Antwerp, 12 bgs.	Wilson,
Turpentine —	
Wilmington, 250 brls.	
Tar —	
Wilmington, 1,750 brls.	

TYNE.

Week ending Mar.

Glucose —	
New York, 25 brls.	
Rotterdam, 20 bgs.	T.
Magnesia —	
Hamburg, 3 cs.	T

GRIMSE

Week ending Mar.

Chemicals (otherwise u.	
Rotterdam, 5 cks.	
Glucose —	
Hamburg, 8 cks.	160 bg

GOOLE

Week ending Mar.

Alum —	
Rotterdam, 27 cks.	
Chrome Oxide —	
Rotterdam, 2 brls.	
Caoutchouc —	
Boulogne, 8 cks.	
Dyestuffs —	
Alizarine —	
Rotterdam, 78 cks.	
Dyestuffs (otherwise u.	
Boulogne, 44 cs.	56 cks.
Glucose —	
Calais, 100 bgs.	
Manure —	
Phosphate Rock —	
Ghent, 800 bgs.	
Muriate —	
Rotterdam, 38 cks.	
Phosphate —	
Antwerp, 500 bgs.	
Phosphate of Lime —	
Antwerp, 250 t.	
Potash —	
Hamburg, 8 bgs.	
Dunkirk, 2 cks.	17 dru
Sugar of Lead —	
Hamburg, 1 ck.	
Soda —	
Rotterdam, 7 cks.	
Sodium Silicate —	
Rotterdam, 1 ck.	
Sodium Nitrate —	
Rotterdam, 5 cks.	
Saltpetre —	
Rotterdam, 385 bgs.	
Waste Salt —	
Hamburg, 1,217 bgs.	

EXPORTS OF CHEMICAL PRODUCTS

LONDON.

Week ending Mar. 22nd.

Alum Cake—

Calcutta, 238 cks. £165

Ammonium Sulphate—

Ghent, 50 t. £650

Dunkirk, 19 17 c. 29

Ghent, 50 17 625

Hamburg, 40 450

" 70 12 840

Ammonium Muriate—

Melbourne, 1 t. 1 c. £75

Alumina Sulphate—

Bordeaux, 51. 12 c. £20

Arsenic—

Reval, 9 t. 18 c. £136

Boston, 50 10 640

Ammonium Carbonate—

Paris, 3 t. 10 c. £106

Melbourne, 20 cs. 30

Yokohama, 1 t. 38

Brimstone—

Madeira, 1 brl. £1

Bisulphide of Carbon—

Cape Town, 30 t. 19 c. £374

Philadelphia, 4 19 62

Boracic Acid—

Wellington, 6 c. £11

Havana, 12 16

Melbourne, 10 15

Coal Products—

Pitch

Madras, 25 mts. £63

Rio Janeiro, 50 brls. 42

Calcutta, 95 62

Dunkirk, bulk. 4,210

Mauritius, 10 cks. 3

Antwerp, 279 t. 400

Pt. de Rose, 830 1,250

Brails, 45 cks. 10

Galatz, 190 brls. 41

Dunkirk, bulk. 182

Cetter, " 1,676

Dunkirk, 798 t. 1,389

Amsterdam, 6 brls. 20

Tar

Bombay, 31 mts. £29

Calcutta, 50 brls. 42

Bombay, 6 t. 11 c. 32

Melbourne, 50 dms. 12

Gothenburg, 70 cks. 49

E. London, 100 dms. 3

Natal, 40 kegs. 4

Sydney, 200 dms. 30 brls. 84

Brails, 120 cks. 66

Galatz, 380 211

Hamburg, 100 brls. 62

Anthracene

Dusseldorf, 417 cks. £2,945

" 64 746

Cologne, 64 342

Rotterdam, 64 428

Benzol

Hamburg, 16 dms. £355

Antwerp, 20 390

Rotterdam, 30 cks. 511

Hamburg, 10 pms. 361

Rotterdam, 20 10 363

Naphthalene

" 23 cks. £91

Carbolic Acid Crystals

Rotterdam, 40 cks. £596

Caustic Soda—

Adelaide, 1 t. 1 c. £22

N. Orleans, 30 283

Carbolic Acid—

B. Ayres, 1 c. £11

Melbourne, 10 c. 15

Cable, 2 12

Bitter, 1,017 gls. 161

Carbolic Solid—

Genoa, 5 drs. 76

Yokohama, 1,000 lbs. £78

Cream of Tartar—

Sydney, 1 t. £103

Melbourne, 10 c. £52

Launceston, 1 1

Melbourne, 2 t. 212

Wellington, 3 17

Copper Sulphate—

Barcelona, 10 t. 4 c. £215

" 4 17 100

Bordeaux, 5 4 110

Wellington, 1 1 97

Alma, 6 30

" 192 192

" 116 116

" 86 86

" 26 26

" 239 239

" 236 236

Chemicals (otherwise undeciphered)

Hamburg, 36 pkgs. £77

Sydney, 46 267

Yokohama, 29 cs. 325

" 75 pks. 595

Madras, 44 170

Limon, 31 cks. 138

Yokohama, 100 kgs. 74

Condy's Fluid—

Sydney, 23 cs. £67

Citric Acid—

Cadiz, 5 c. £40

Brussels, 10 74

Hiogo, 3 24

Yokohama, 3 20

Madras, 1 8

Seville, 3 22

Amsterdam, 3 kegs. 22

Hamburg, 2 15

Disinfectants—

Natal, £71

Melbourne, 50 drs. 30 cks. 42

" 10 pkgs. 26

Sydney, 60 cs. 23

Hamburg, 40 cks. 200

Guano—

Mauritius, 51 t. 4 c. 298

Hyposulphite of Lime—

Rotterdam, 20 cs. £120

Manure—

Cherbourg, 70 t. £460

Malaga, 35 18 c. 302

Rotterdam, 31 160

Stettin, 204 8 880

Cologne, 19 12 122

Barbadoes, 3 31

Hamburg, 200 2,400

Townsville, 4 3 75

Trinidad, 50 657

St. Kitts, 5 59

Barbadoes, 2 9 17

Rochefort, 100 350

Cologne, 29 10 205

Mauritius, 84 15 404

Melbourne, 70 945

Sydney, 45 600

Harlingen, 78 1 345

Rotterdam, 15 135

Newfairwater, 620 4 2,840

Genoa, 23 120

Muriatic Acid—

Malaga, 4 t. 2 c. £30

Oxalic Acid—

Yokohama, 20 kgs. £32

Phosphorus—

Kobe, 1 t. 7 c. £361

Yokohama, 34 cs. £472

" 25 288

Kobe, 6 75

Yokohama, 40 477

Potassium Chlorate—

Melbourne, 1 t. £44

Potash—

Gothenburg, 10 c. £24

Picric Acid—

B. Ayres, 1 cs. £11

Potassium Sulphate—

Mauritius, 26 t. £260

Potassium Cyanide—

Madras, 1 t. £52

Algoa Bay, 1 10 c. 112

Soda—

Sydney, 21. 1 c. £15

Sheep Dip—

Algoa Bay, 5 t. £269

New York, 22 6 c. 1,125

Natal, 3 8 145

" 500 drs. 101

" 125 33

Algoa Bay, 17 cs. 48

Sulphur—

Madeira, 14 t. 14 c. £154

Calcutta, 15 18 638

Saltcake—

Antwerp, 130 t. £227

Salammoniac—

Wellington, 12 c. £20

B. Ayres, 4 cks. 41

Saltpetre—

Sydney, 2 t. £45

Limon, 5 112

Greytown, 10 c. 55

Bilbao, 2 10 34

Wellington, 1 10 34

Sulphur Flowers—

Madeira, 5 t. 5 c. £50

Melbourne, 4 19 45

Lisbon, 950 brls. 734

Madeira, 480 370

Wellington, 2 t. 14

Superphosphate—

Charente, 11 t. 13 c. £34

Mauritius, 11 14 175

Cherbourg, 185 t. 555

Rotterdam, 37 12 c. 150

Almeria, 4 19 28

Bordeaux, 29 17 90

Sodium Tartrate—

Melbourne, 5 c. £22

Sulphuric Acid—

Natal, 3 t. 13 c. £16

Sodium Nitrate—

Kobe, 34 t. 17 c. £318

Salicylic Acid—

Melbourne, 3 cs. £22

" 1 c. 29

Sodium Acetate—

New York, 5 t. 11 c. 20

Sodium Sulphate—

Ghent, 50 t. £50

Sheep Wash—

Kingston, Jan. 60 drs. £20

Tartaric Acid—

Sydney, 3 t. 3 c. £454

Wellington, 5 40

Fremantle, 5 40

Piraeus, 1 ck. 30

Melbourne, 10 c. £65

Sydney, 1 120

" 5 34

Wellington, 3 21

LIVERPOOL.

Week ending Mar. 26th.

Alum—

Calcutta, 15 t. 1 c. £37

Oporto, 5 1 26

Calcutta, 3 1 2 q. 9

Genoa, 2 2 1 13

Acetic Acid—

Vera Cruz, 2 cs. 20 cks. £105

Alum Cake—

Calcutta, 8 t. 8 c. £40

Alum Sulphate—

Vera Cruz, 2 cks. £22

Ammonium Muriate—

Havre, 1 t. 6 c. £21

Gothenburg, 13 3 q. 15

Ammonium Sulphate—

Antwerp, 31 t. 10 c. £378

Rio Janeiro, 19 2 q. 13

Bremerhaven, 10 120

Gothenburg, 53 636

Gr. Canary, 6 3 1 50

Hamburg, 20 240

Las Palmas, 4 3 47

Antwerp, 31 10 378

Barbadoes, 50 10 606

Valencia, 5 2 2 59

" 5 3 1 58

Ammonium Carbonate—

Corunna, 5 c. £8

Leghorn, 10 3 q. 18

Barcelona, 12 2 20

Genoa, 17 26

Calcutta, 1 t. 10 52

Bleaching Powder—

Antwerp, 25 brls. 25

Bilbao, 96 cks. 165 tcs. 81 cs.

Boston, 131 81 cs.

Calcutta, 27 27

Naples, 13 13

New York, 25 25

Philadelphia, 60 60

Rouen, 103 103

Boston, 214 214

New York, 145 145

Rouen, 14 14

Vera Cruz, 30 brls. 30

Boracic Acid—

Palermo, 2 c. 3 q. £5

Brimstone—

Calcutta, 7 t. 19 c. 1 q. £37

Borax Crystals—

Callao, 1 t. £31

Borate of Lime—

Havre, 21. 1 c. 3 q. £2

Caustic Soda—

Algoa Bay, 19 cs. 19

Antwerp, 49 dms. 49

Barcelona, 262 262

Bilbao, 12 12

Boston, 400 400

Coquimbo, 60 60

Galatz, 105 105

Ihrail, 40 40

Leghorn, 90 90

Lisbon, 134 134

Malaga, 45 45

Iron Oxide—	
Valparaiso, 59 t. 10 c. 3 q.	£149
B. Ayres, 37	185
Magnesium Citrate—	
Corunna, 1 c.	£17
Manure—	
Antwerp, 19 t 4 c. 1 q.	£100
Pitch—	
Genoa, 1,179 t.	
Syra, 20 brls.	
Potassium Carbonate—	
Madrid, 4 c.	£5
Potassium Chlorate—	
Hamburg, 10 c.	£22
Vigo, 2	11
Gothenburg, 34 t.	1,467
New York, 5	222
Phosphate—	
Hamburg, 32 t.	£120
Potassium Bichromate—	
Havana, 8 c. 3 q.	£16
Alexandria, 12	23
Sodium Bicarbonate—	
Alexandria, 8 kgs	
Barcelona, 110	
Bilbao, 100	
Bordeaux, 60	
Boston, 110	
Marseilles, 240	
Nantes, 30	
Palermo, 26	
St. Johns, Nfld. 40	
San Sebastian, 10	
Sydney, 30	67 cks.
Yokohama, 1,000	
Antwerp, 32	6
Canada, 100	29
Hamburg, 22	
Rotterdam, 23	
Salt—	
Calcutta, 3,681½ t.	
Edina, 25	
Fredericia, 485	
Isles de Los, 25	
New Orleans, 70	
Sierra Leone, 50	
Valparaiso, 51	
Brass, 50	
Calcutta, 3,171	
Chicago, 65	
Conakry, 50	
Coquimbo, 50	
Faroe Islands, 70	
Ibrail, 544	
Lavannah, 50	
Madeira, 4	
Manoh, 122	7 c.
Salt Pond, 6½	
Sydney, 250	
Soda Ash—	
Boston, 220 tcs. 64 cks. 1,696 bgs.	
B. Ayres, 20 brls.	
Calcutta, 6	
Havana, 4	
New York, 133	
Philadelphia, 153	355 tcs.
Rio Janeiro, 25	
Sydney, 64	
Yokohama, 120	
Beyrout, 47	
Boston, 303	
Canada, 40	122
Malta, 40	
New York, 422	
Puerto Cabelo, 4	
San Francisco, 68	
Smyrna, 50	
Syra, 15	
Philadelphia, 415	
Smyrna, 90	
Sodium Silicate—	
Barcelona, 20 cks.	
Lisbon, 16	
Santander, 32	
Seville, 20	
Varna, 10 brls.	
Soda Crystals—	
Philadelphia, 440 cks.	
Rotterdam, 20 brls.	
Halifax, 20	
Sulphuric Acid—	
Iquique, 1 t.	£11
Sheep Dip—	
Algoa Bay, 3 t.	£100
Saltpetre—	
Paraguay, 3 t. 10 c. 2 q.	£80
Parahyba, 1 14	39
Piræus, 3 15	82
Callao, 1 5	27
Bahia, 1 2	28
Pernambuco, 5 14	128

Soda Salts—	
Montreal, 1 t.	1 q.
Sal ammoniac—	
Alexandria, 17 c. 2 q.	£31
Alexandria, 17 c. 2 q.	11
Antwerp, 10 3	19
Palermo, 4	7
Patras, 6 1	11
Smyrna, 1 t.	35
Acajutla, 10	20
Galatz, 3 1	5
Sulphur—	
Iquique, 34 t. 18 c.	£279
Calcutta, 15	90
St. John, N.B., 4 t. 1 c. 2 q.	26
Boston, 75 2	338
" 50 2	225
" 100	400
Madras, 5 5	30
Superphosphate—	
Hamburg, 20 t.	£75
Sodium Nitrate—	
Barcelona, 5 t. 1 c.	£48
Saltcake—	
Baltimore, 100 t. 7 c.	£241
Philadelphia, 37 16	80
Tar—	
Bilbao, 30 brls.	
Tin Oxalate—	
Vera Cruz, 3 brls.	£35
Tin Oxide—	
Canada, 6 c. 1 q.	£43
Zinc Chlorate—	
Huelva, 1 t. 19 c.	£28
Zinc Muriate—	
Bombay, 2 t. 19 c. 2 q.	£47

GLASGOW.

Week ending March 27th.

Ammonium Sulphate—	
Demerara, 46 t. 1½ c.	£579
Bleaching Powder—	
Dunedin, 2 t. 10 c.	£20
Copper Sulphate—	
Venice, 5 t. 3 c.	£102
Trieste, 28 14½	583
Bordeaux, 16 19½	362
Dyestuffs—	
Indigo	
New York, 72 c.	£80
Logwood	
Dunedin, 40 t. 16½ c.	£449
Manure—	
Trinidad, 314 t. 9 c.	£3,449
Demerara, 320 17½	2,422
Oxalic Acid—	
Dunedin, 2 t. 15½ c.	£116
Paraffin Wax—	
Naples, 20 c.	£33
Bombay, 1 t. ½	32
Dunedin, 70	70
Genoa, 16 16	388
Potassium Bichromate—	
Bombay, 17½ c.	£31
Rotterdam, 19 cks.	267
Dunedin, 2 t. 13¾	97
Venice, 25½	45
Bordeaux, 5 12¾	180
Genoa, 269½ 83¾	597
" 83¾	141
Amsterdam, 3 cks.	25
Christiania, 1	1
Pitch—	
Chili, 1	£192
Amsterdam, 250 t.	£250
Potassium Prussiate—	
New York, 29 c.	£114
Potassium Carbonate—	
Bombay, 1 t. 16½ c.	£33. 118.
Sulphuric Acid—	
Madras, 8 t. 7½ c.	£40
Soda Ash—	
Dunedin, 3 t. 17½ c.	£24
Superphosphate—	
Trinidad, 169 t. 6 c.	£550
Sodium Bichromate—	
Nantes, 5 t. 5¾ c.	£160
Bombay, 1 13¾	44
Genoa, 10 t.	285
Sugar of Lead—	
Bombay, 3 t. 2¾ c.	£59
Tar—	
Colombo, 12 t.	£26
Madras, 16	34

TYNE.

Week ending Mar. 27th.

Antimony—	
Antwerp, 1 t.	
Batoum, 3 3 c.	
Copenhagen, 6	
New York, 17 t.	
Rouen, 5	
Alkali—	
Newfairwater, 31 t. 1 c.	
Gothenburg, 8 6	
Antwerp, 15 7	
Copenhagen, 1 4	
Stettin, 4 16	
Rotterdam, 19	
New York, 176 1	
Philadelphia, 200 10	
Alumina Sulphate—	
Rouen, 7 t 6 c.	
Ammonium Carbonate—	
Rotterdam, 2 t. 5 c.	
Barytes Nitrate—	
Rouen, 4 t. 19 c.	
Barytes Carbonate—	
Antwerp, 11 t.	
Rouen, 49 2 c.	
New York, 50	
Bleaching Powder—	
Newfairwater, 42 t. 7 c.	
Gothenburg, 5 12	
Antwerp, 50 9	
Hamburg, 183 14	
" 52 15	
Genoa, 10	
Libau, 186 17	
Christiania, 20 3	
Aalborg, 10	
Malmo, 13 4	
Rotterdam, 12 19	
" 19 2	
Stettin, 262 11	
New York, 176 10	
Philadelphia, 100 3	
Rouen, 5 1	
Copperas—	
Randers, 1 t. 2 c.	
Aalborg, 2 2	
Copenhagen, 5 14	
Stettin, 3 2	
Chloride of Lime—	
New York, 140 t. 9 c.	
Caustic Soda—	
Newfairwater, 14 t. 3 c.	
Caustic Soda—	
Antwerp, 6 t. 12 c.	
Odessa, 70 4	
Christiania, 6 14	
Dunkirk, 21 16	
New York, 158 2	
Philadelphia, 29	
Rouen, 3 3	
Gypsum—	
New York, 39 t. 5 c.	
Litharge—	
Gothenburg, 5 c.	
Lisbon, 17	
Copenhagen, 5	
Riga, 4 t. 18	
New York, 10 8	
Rouen, 2 17	
Manure—	
Rotterdam, 40 t.	
Magnesia—	
Hamburg, 9 c.	
Genoa, 1 t. 3	
Phosphate—	
Drontheim, 10 t.	
Potassium Chlorate—	
Randers, 1 t.	
Soda Ash—	
Antwerp, 10 t.	
Hamburg, 9 18 c.	
Genoa, 10 8	
Libau, 20 5	
Stettin, 10 6	
Newfairwater, 111 4	
New York, 166 3	
Soda—	
Gothenburg, 2 t. 17 c.	
Genoa, 8 18	
Aarhus, 11 5	
Esbjerg, 3 4	
Rotterdam, 3 4	
New York, 277 10	
" 27	
Philadelphia, 471 17	
Sodium—	
Hamburg, 1 cs.	
Sodium Hyposulphate—	
Rouen, 7 t.	

Sodium Sulphate—

Malmo, 341 t.
Sodium Bicarbonate—
Aalborg, 12 c.
Superphosphate—
Korsør, 25 t.
Sodium Chlorate—
Hamburg, 1 t. 2 c.
Tar—
Riga, 45 t.

[HULL.]

Week ending March 25th.

Benzol—	
Hamburg, 14 drums.	
Bone Size—	
Harlingen, 1 ck.	
Caustic Soda—	
Antwerp, 1 ck.	
Christiansund, 29 drms.	
Libau, 306	
Chemicals (otherwise undescrib)	
Antwerp, 4 cks.	
Amsterdam, 5	
Bremen, 99	
Bombay, 1,308	
Boston, 70	50 pks.
Christiania, 12	164 slbs.
Copenhagen, 11	
Danzig, 41	40
Drontheim, 10	
Dunkirk, 20	
Gothenburg, 11	15 39
Hamburg, 12	80 120
Hango, 10	
Libau, 10 cs. 18 cks. 45 pks.	
Lisbon, 13 31	
Reval, 2 28	
Rotterdam, 42 49 40	
Dyestuffs (otherwise undescrib)	
Antwerp, 1 kg.	
Bergen, 1 cs.	
Boston, 30 cks.	
Hamburg, 2 kg. 1 cs. 3 dru	
Reval, 36 cks.	
Rotterdam, 2 cs. 3 cks. 1	
Rouen, 1	
Manure—	
Drontheim, 335 bgs.	
Ghent, 1,638	
Hamburg, 687	
Stettin, 250	
Pitch—	
Antwerp, 426 t.	
Drontheim, 230	
Tar—	
Hamburg, 5 cks.	

GRIMSBY.

Week ending March 22nd.

Coal Products—	
Dieppe, 35 cks. 65 pkgs.	
Chemicals (otherwise undescrib)	
Antwerp, 45 cks.	
Dieppe, 170	
Hamburg, 15	
Rotterdam, 2	

GOOLE.

Week ending March 19th.

Alkali—	
Boulogne, 12 cks.	
Bleaching Powder—	
Rotterdam, 28 cks.	
Benzol—	
Dunkirk, 46 cks.	
Rotterdam, 48	
Coal Products—	
Boulogne, 1 ck. 2 cs.	
Rotterdam, 83 cks.	
Chemicals (otherwise undescrib)	
Ghent, 15 cks.	
Hamburg, 114	
Rotterdam, 1 pkg.	
Dyestuffs (otherwise undescrib)	
Dunkirk, 4 cks.	
Ghent, 4 drums.	
Manure—	
Antwerp, 580 bgs.	
Hamburg, 438	
Rotterdam, 2 cks.	
Pitch—	
Antwerp, 489 t.	

PRICES CURRENT.

WEDNESDAY, APRIL 2, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
25 % and 40 %	per cwt	7/6	& 12/9
Glacial	"	67/6	
S.G., 2000°	"	0	12 9
82 %	nett per lb.	0	0 6½
(Tower Salts), 30° Tw.	per bottle	0	0 3¼
(Cylinder), 30° Tw.	"	0	2 11
0° Tw.	per lb.	0	0 2
"	"	0	0 1¼
"	nett	0	0 3½
"	"	0	1 4
ic (fuming 50 %)	per ton	15	10 0
(monohydrate)	"	5	10 0
(Pyrites, 168°)	"	3	2 6
(" 150°)	"	1	8 0
(free from arsenic, 140/145°)	"	1	10 0
ous (solution)	"	2	15 0
(pure)	per lb.	0	1 0½
"	"	0	1 2½
white powdered	per ton	13	0 0
se lump	"	4	15 0
Sulphate (pure)	"	5	0 0
" (medium qualities)	"	4	10 0
n	per lb.	0	15 0
, 880=28°	per lb.	0	0 3
=24°	"	0	0 1¼
Carbonate	nett	0	0 3½
Muriate	per ton	23	0 0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-
Nitrate	per ton	41	10 0
Phosphate	per lb.	0	0 10½
Sulphate (grey), London	per ton	11	13 9
" (grey), Hull	"	11	12 6
il (pure)	per lb.	0	0 11½
alt	"	0	0 8½
"	per ton	75	0 0
(tartar emetic)	per lb.	0	1 1
(golden sulphide)	"	0	0 10
chloride	per ton	8	0 0
arbonate (native)	"	3	15 0
ulphate (native levigated)	"	45/-	to 75/-
Powder, 35 %	"	5	10 0
Liquor, 7 %	"	2	10 0
e of Carbon	"	13	0 0
1 Acetate (crystal)	per lb.	0	0 6
Chloride	per ton	2	2 6
y (at Runcorn) in bulk	"	17/6	to 35/-
Dyes:—			
e (artificial) 20 %	per lb.	0	0 9
a	"	0	0 3 9
Products			
ene, 30 % A, f.o.b. London	per unit per cwt.	0	1 5
90 % nominal	per gallon	0	3 4
50/90	"	0	2 7
c Acid (crystallised 35°)	per lb.	0	0 10¼
" (crude 60°)	per gallon	0	2 8
e (ordinary)	"	0	0 2½
(filtered for Lucigen light)	"	0	0 3
Naphtha 30 % @ 120° C.	"	0	1 4
Oils, 22° Tw.	per ton	3	0 0
.o.b. Liverpool or Garston	"	1	8 0
Naphtha, 90 % at 160°	per gallon	0	1 9
1 Oils (crude)	"	0	0 2½
hili Bars)	per ton	47	12 6
lphate	"	26	0 0
ide (copper scales)	"	51	0 0
(crude)	"	30	0 0
(distilled S.G. 1250°)	"	55	0 0
"	nett, per oz.	8½	d. to 9d.
hate (copperas)	per ton	1	10 0
hide (antimony slag)	"	2	0 0
et) for cash	"	14	0 0
arge Flake (ex ship)	"	15	10 0
tate (white ")	"	23	10 0
" (brown ")	"	18	5 0
bonate (white lead) pure	"	19	0 0
ate	"	22	0 0

Lime, Acetate (brown)	"	8	0 0
" (grey)	per ton	13	15 0
Magnesium (ribbon and wire)	per oz.	0	2 3
" Chloride (ex ship)	per ton	2	6 3
" Carbonate	per cwt.	1	17 6
" Hydrate	"	0	10 0
" Sulphate (Epsom Salts)	per ton	3	0 0
Manganese, Sulphate	"	18	0 0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
" Ore, 70 %	per ton	4	10 0
Methylated Spirit, 61° O.P.	per gallon	0	2 2
Naphtha (Wood), Solvent	"	0	3 10
" Miscible, 60° O.P.	"	0	4 6
Oils:—			
Cotton-seed	per ton	22	10 0
Linseed	"	24	10 0
Lubricating, Scotch, 890°—895°	"	7	5 0
Petroleum, Russian	per gallon	0	0 5¼
" American	"	0	0 5¼
Potassium (metal)	per oz.	0	3 10
" Bichromate	per lb.	0	0 4
" Carbonate, 90% (ex ship)	per ton	18	10 0
" Chlorate	per lb.	0	0 5
" Cyanide, 98%	"	0	2 0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10 0
" " (Caustic Potash) 75/80 %	"	21	10 0
" " (Caustic Potash) 70/75 %	"	20	15 0
" Nitrate (refined)	per cwt.	1	3 6
" Permanganate	"	4	5 0
" Prussiate Yellow	per lb.	0	0 9½
" Sulphate, 90 %	per ton	9	10 0
" Muriate, 80 %	"	7	15 0
Silver (metal)	per oz.	0	3 7½
" Nitrate	"	0	2 5½
Sodium (metal)	per lb.	0	4 0
" Carb. (refined Soda-ash) 48 %	per ton	6	2 6
" " (Caustic Soda-ash) 48 %	"	5	2 6
" " (Carb. Soda-ash) 48 %	"	5	10 0
" " (Carb. Soda-ash) 58 %	"	6	15 0
" " (Soda Crystals)	"	2	17 6
" Acetate (ex-ship)	"	15	15 0
" Arseniate, 45 %	"	11	0 0
" Chlorate	per lb.	0	0 6¼
" Borate (Borax)	nett, per ton.	30	0 0
" Bichromate	per lb.	0	0 3
" Hydrate (77 % Caustic Soda)	per ton.	13	0 0
" " (74 % Caustic Soda)	"	11	15 0
" " (70 % Caustic Soda)	"	10	10 0
" " (60 % Caustic Soda, white)	"	9	10 0
" " (60 % Caustic Soda, cream)	"	9	0 0
" Bicarbonate	"	6	0 0
" Hyposulphite	"	5	10 0
" Manganate, 25 %	"	9	0 0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8 0
" Nitrite, 98 %	per ton	27	10 0
" Phosphate	"	15	15 0
" Prussiate	per lb.	0	0 7¼
" Silicate (glass)	per ton	5	7 6
" " (liquid, 100° Tw.)	"	3	17 6
" Stannate, 40 %	per cwt.	2	0 0
" Sulphate (Salt-cake)	per ton.	1	12 6
" " (Glauber's Salts)	"	1	10 0
" Sulphide	"	7	15 0
" Sulphite	"	5	5 0
Strontium Hydrate, 98 %	"	8	0 0
Sulphocyanide Ammonium, 95 %	per lb.	0	0 8
" Barium, 95 %	"	0	0 5¼
" Potassium	"	0	0 8
Sulphur (Flowers)	per ton.	7	15 0
" (Roll Brimstone)	"	6	0 0
" Brimstone: Best Quality	"	4	5 0
Superphosphate of Lime (26 %)	"	2	10 0
Tallow	"	25	10 0
Tin (English Ingots)	"	94	0 0
" Crystals	per lb.	0	0 6¼
Zinc (Spelter)	per ton.	27	0 0
" Chloride (solution, 96° Tw.	"	6	0 0

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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THE PROPERTIES OF ALUMINUM, WITH SOME INFORMATION RELATING TO THE METAL.

BY ALFRED E. HUNT, JOHN W. LANGLEY, AND CHARLES HALL.

PRACTICAL HINTS.

DIPPING AND PICKLING.—Remove the dirt and grease from plates by dipping in benzene. To whiten the metal, leaving the surface a beautiful white mat, the sheet should be first dipped in a strong solution of caustic potash. This solution should then be dipped in a mixture of concentrated acids, two parts nitric acid; then in a solution of undiluted nitric acid; then in a mixture of vinegar and water, equal parts; then washed thoroughly in water and dried as usual in hot sawdust.

TO POLISH.—Use a fine white polishing composition or rouge, tripoli, and a sheep-skin or chamois-skin buff, although it is often polished with an ordinary rag buff.

For fine work, to polish aluminum, use a mixture of equal parts, weight of olive oil and rum, made into an emulsion by being well shaken together in a bottle. The polishing stone is dipped in this liquid, and the metal is polished, without using, however, too much pressure.

Aluminum may be easily ground by using olive oil and pumice.

The surface of aluminum treated with a varnish of four parts oil turpentine to one of stearic acid, or with a mixture of olive oil and rum shaken into an emulsion, allows an engraving tool to work on aluminum as on pure copper.

FOR BURNISHING.—Use a blood-stone or steel burnisher. For hand burnishing, use either kerosene oil or a solution composed of two tablespoonfuls of ground borax dissolved in about a quart of hot water with a few drops of ammonia added.

FOR LATHE WORK.—The burnisher should wear upon the finger of his left hand a piece of cotton flannel, keeping it soaked with kerosene, and bringing it in contact with the metal, supplying a constant lubricant.

Very fine effects can be produced by first burnishing or polishing the metal, and then stamping it in polished dies, showing unpolished figures in relief.

SCRATCH BRUSHING.—Polish or burnish the surface and then use a fine steel scratch brush. A very fine finish is attained by rubbing with ground pumice stone and water.

In spinning aluminum, plenty of oil should be used to prevent the clogging of the tool and to make it cut smooth in the turning and assist in the spinning.

TO SOLDER THE METAL.—Soldering the metal in large surfaces has not been successfully accomplished up to the present. Small surfaces of the metal can be readily soldered by the use of pure zinc and Venetian turpentine. Place the solder upon the metal, with the Venetian turpentine, and heat gently with a blow pipe until the solder is melted. It will then be found to have fixed itself firmly to the aluminum. The trouble with this, as with other solders, is that it will not flow on the metal. Therefore, large surfaces are not easily soldered.

In cold rolling aluminum, upon rolls designed for cold rolling ha-crucible steel, it has been found possible to reduce aluminum through the same sections as hard steel; the aluminum required, on the average, five annealings, where the steel required three to satisfactorily withstand the same work.

ALLOYS OF ALUMINUM AND COPPER.—Ten per cent. aluminum with 90 per cent. copper (called 10 per cent. aluminum bronze), roll into plates, has an elastic limit of 70,000 to 80,000 pounds per square inch, a tensile strength of from 100,000 to 120,000 pounds per square inch, reduction of area of from 20 to 40 per cent., with an elongation of from 5 to 10 per cent. in 8 inches. The metal is a beautiful yellow color and is susceptible of taking a fine polish. One great advantage of the metal is its freedom from corrosion from the action of the air, either moist or dry, or water, upon it. Its specific gravity, in castings, is about 7.84, and in rolled sheets about 7.89. Its modulus of elasticity is about 18,000,000 pounds. In castings, it has a tensile strength of between

*Paper read at the meeting of the American Institute Mining Engineers, February 1890.

80,000 pounds per square inch, with a reduction of area of 10 per cent.

Tests upon 10 per cent. aluminum bronze $\frac{3}{4}$ -inch diameter and 2 inches long, gave an ultimate compressive strength of 153,000 pounds per square inch, the specimens being shortened by 10 per cent. A similar piece of 5 per cent. bronze was shortened to 10 per cent. and gave an ultimate compressive strength of 153,000 pounds per square inch.

10 per cent. aluminum bronze in tension has an elastic limit of 100,000 pounds per square inch; a tensile strength of about 150,000 pounds per square inch; a reduction of area of from 30 to 50 per cent. Its specific gravity is from 8.20 to 8.30. Two and one-half per cent. aluminum bronze has a specific gravity of 8.6.

Its melting point of 10 per cent. bronze is about 1700° Fahrenheit higher than that of ordinary brass. The metal shrinks a little $\frac{1}{8}$ " to the foot, or a little less than ordinary brass. It solidifies rapidly from the molten condition, and it is necessary to pour it quickly. The feed gates should be made large enough to prevent metal freezing. Hot baked sand molds should be used for 10 per cent. Precautions should be taken also to prevent oxidation of the metal, for without it, the oxide is carried into the metal, which is rolling into sheets. It is well also to bottom pour the metal into the mold—that is, to cast the metal into a hot ladle, having the bottom in direct connection with the gate of the casting, so that the oxide and dross shall come to the surface, in this way preventing its entering into the casting. The surface of the molten bath shall be kept covered with charcoal. It is also advantageous to keep the bath covered with charcoal in some cases, although the disadvantage of this is that the metal will cut the sides of the pot and add silicon to the metal. It is also to cast the metal in an inert atmosphere (casting in a cloud of smoke or gas), to prevent the oxidation from the air in the mold attacking the metal.

Aluminum bronze is an extremely dense, close metal. It can be heated at a bright red heat as easily as can wrought iron. In this respect it differs from all other forms of bronze, which are red-short at a bright red heat. The fact that aluminum bronze is malleable at a red-heat, at this temperature without change, makes it especially adapted for blast furnace tuyeres. The metal can be hardened to a considerable extent by working without annealing.

Aluminum bronze, heat to a dull red heat and permit it to cool gradually.

Alloy of aluminum and copper does not volatilise at any ordinary temperatures used in fusing it, and, consequently, it can be frequently used without any appreciable change in the chemical constituents of the metal. This has great advantages in the economic use of the metal. The scrap in castings or rolling can be readily remelted into the same quality metal.

Aluminum bronze can be brazed as well as any other metal, using solder:—Zinc, 50 per cent.; copper, 50 per cent.; using $\frac{1}{4}$ of the weight of borax and cryolite in equal parts.

Pure aluminum, as now manufactured by the Pittsburgh Reduction Company, very pure aluminum bronze alloys can readily be made by the impurities in the aluminum being reduced to one-tenth their weight by being diluted with pure electrolytic lake copper.

Following are some of the analyses of aluminum bronzes lately made by the Pittsburgh Reduction Company and by the Scovill Manufacturing Company:—

Kind of Alloy.	Per ct. aluminum.	Per cent. copper.	Per ct. graphitoid silicon.	Per ct. non-graphitoid silicon.	Per ct. iron.	Specific gravity.
10 per cent. bronze cast-made December 1889.....	9.20	90.00	0.117	0.370	0.077	7.690
10 per cent. bronze cast-made December 1889.....	4.70	94.84	0.080	0.320	0.060	8.25
10 per cent. bronze cast-made December 1889.....	2.35	97.29	0.05	0.26	0.050	8.61
10 per cent. bronze cast-made at New-m.....	6.32	91.98	0.09	1.09	0.48	8.01

ALLOYS OF ALUMINUM AND IRON.

ALUMINUM IN WROUGHT IRON.—The influence of aluminum in wrought iron fluid has been taken advantage of in the well-known Mitis process of making castings of wrought iron. Aluminum

furnished by the Pittsburgh Reduction Company has been found to be very advantageous, and is largely used in the manufacture of Mitis metal. Aluminum will also increase the tensile strength of wrought iron and improve the fibre, if added either as pure metal or in the form of ferro-aluminum to the molten bath, just before the metal comes to nature in the puddling furnace.

ALUMINUM IN CAST IRON.—The influence of aluminum in cast iron is to turn the combined carbon to graphite—that is, to make the white iron gray, and also to close the texture of the metal (W. J. Keep.) It makes the metal ordinarily more fluid, and it also makes it susceptible of taking a better polish and retaining it free from oxidation. Aluminum will also increase the tensile strength of many grades of cast iron, and aids in obtaining sound castings free from blow-holes.

It has been used in the preparations from one-tenth of one per cent. to two per cent. with good results, with various grades of iron.

ALUMINUM IN STEEL.—The influence of aluminum in steel of high carbon, is to turn the carbon combined into a graphite, and destroys the hardening action of the carbon in tool steel. Aluminum in this sense softens steel. In structural steel of 20 per cent. carbon, a small amount of aluminum, up to 1 per cent. increases the tensile strength without to any great degree decreasing the ductility. By its aid, a higher tensile strength can be obtained in thick sections of steel which have not been subjected to cut little work, than can be otherwise obtained. Although aluminum, with considerable quantities of graphitoid silicon have been added to steel, no graphitoid silicon has been found in the steel afterwards, it being all found in the amorphous or combined state in the resulting steel. The influence of aluminum also is to lower the melting point of the steel, and in this way make it more fluid. Its influence also is to make the ingots of steel more solid and more free from blow-holes. It can be most advantageously used in proportions of from one-tenth of 1 per cent. up to 3 per cent. of aluminum.

* TABLE OF TENSILE TESTS OF IRON AND STEEL CONTAINING ALUMINUM.

CHARACTER OF MATERIAL TESTED.	ANALYSIS.							Character of fracture.	
	Elastic limit per sq. in.	Tensile strength per sq. in.	Per cent. elonga- tion in 8 in.	Per cent. reduc- tion of area.	Per ct. alu- minium.	Per ct. car- bon.	Per ct. man- ganese.		Per ct. sili- con.	Per ct. phos- phorus.
All iron muck bar rolled, Union Mills of C., P. and Co., Limited	27,300	46,500	28.00	36.98	0.04	0.12	0.41	0.02	0.00
Three parts all iron with two parts alumi- num muck.....	26,800	49,000	29.25	40.32	0.07	0.16	0.48	0.03	0.03
All aluminum muck bar.....	49,500	55,300	14.00	22.56	0.03	0.16	0.39	0.02	0.00
Four parts all iron with one part alumi- num muck.....	28,510	49,100	29.50	37.34	0.04	0.12	0.41	0.02	0.00
Open-hearth steel, with 1-10 of 1 per cent. aluminum, ¾-in. thick, plates.....	40,950	58,590	30.10	63.82	0.04	0.12	0.41	0.02	0.00
Open-hearth steel, with 1-10 of 1 per cent. aluminum, 1-in. thick, plates.....	47,050	68,360	25.30	59.10	0.07	0.16	0.48	0.03	0.03
Open-hearth steel, with 1-10 of 1 per cent. aluminum, 2-in. thick, bar steel.....	46,260	63,760	26.10	47.90	0.03	0.16	0.39	0.02	0.00
Open-hearth steel, with 1-10 of 1 per cent. aluminum, 2-in. thick, bar steel.....	45,980	67,560	29.20	54.80	0.06	0.15	0.55	0.04	0.00

METHODS OF ANALYSIS OF ALUMINUM AND ITS ALLOYS.

As most of the properties of aluminum are very materially affected by the purity of the metal, and as the literature of methods of analyses of aluminum metals and its alloys is very scant, we have considered it appropriate to append to the paper the methods used by the Pittsburgh Testing Laboratory, chemists for the Pittsburgh Reduction Company, in their various analyses referred to, and which have been largely used as a basis of information in the conclusions drawn in this paper.

SCHEME FOR ANALYSIS OF METALLIC ALUMINUM.

FOR IRON.—Dissolve from 1 to 5 grammes of the metal in hydrochloric acid, and reduce with stannic chloride, taking up the excess of stannic chloride with bi-chloride of mercury. Titrate with a standard solution of bi-chromate of potash.

FOR SILICON.—Dissolve one gramme of the metal in aqua regia, composed of equal parts of nitric and hydrochloric acids; evaporate to dryness; take into solution with 5 cubic centimetres of strong hydrochloric acid; add water, boil and filter off the grey residue; wash with dilute hydrochloric acid; ignite and weigh as silicon, plus silica; fuse with carbonate of soda; dissolve in dilute muriatic acid; evaporate to dryness; re-dissolve in dilute hydrochloric acid and filter off total silica. The difference between the weight of the silicon and the silica being the oxygen, which is united with the graphitoid silicon, from which the amount of graphitoid silicon can be calculated.

COPPER AND LEAD.—Dilute the filtrate from the silica till free hydrochloric acid is only about 1 per cent. of the solution. Pass sulphuretted hydrogen through the hot solution, and filter off sulphate of copper and lead. Dissolve in 1.2 nitric acid and filter of sulphur. Add 5 cc. sulphuric acid and evaporate to sulphur fumes. Dilute, and in a short time filter from sulphate of lead into a platinum dish. The lead sulphate should be weighed and lead calculated from it. Nearly neutralise with ammonia, leaving about two drops of sulphuric acid (dilute) and precipitate copper by battery.

ALUMINUM.—Receive filtrate from sulphate of copper and lead in 500 cc. flask and make up to the 500 cc. mark with water. Take 50 cc. of the solution (equal to 1.10 gramme of the metal), boil off the free sulphuretted hydrogen; oxidize the iron in the solution with a little bromine water, and add sufficient ammonia to precipitate the sesqui-oxide of iron and alumina, which, after careful washing, ignite and weigh. Subtract the sesqui-oxide of iron calculated from the iron found by titration and the weight of any phosphoric acid which may be present, and calculate the remainder as Al_2O_3 , from which the percentage of aluminum can be readily reckoned. (We have not found more than a trace of phosphorus in any of the samples of aluminum manufactured by the Pittsburgh Reduction Company.)

CALCIUM.—A trace may be found in the filtrates from iron and alumina, and is separated in the usual way. The filtrates from the calcium can be readily examined for magnesium. (We do not find any magnesium present in the metal manufactured by the Pittsburgh Reduction Company.)

ALKALIES.—Dissolve one gramme in hydrochloric acid and evaporate in a platinum dish to separate the silica, and proceed as usual until the sesqui-oxides of alumina and iron are precipitated with ammonia. Dissolve this, after washing, in nitric acid, in platinum and evaporate to dryness on the water-bath. Finally, heat over a small flame until the nitrate of alumina is all decomposed. This condition is indicated when the residue is white and friable, and no acid fumes can be detected by ammonia. Treat residue with hot water and get alkali nitrates in solution. This, together with the filtrate from alumina, contains all the alkali present, which should be evaporated, and after separating contained portions of lime and magnesia, weighed as chlorides. (No sodium or potassium is found in the metal manufactured by the Pittsburgh Reduction Company.)

METHODS OF ANALYSIS OF ALUMINUM IRON AND STEEL.

The accurate determination of aluminum when present in minute proportions, as less than .10 per cent., in iron or steel, has been a very difficult problem, requiring very skilled work to obtain accurate results. The method given by Mr. Andrew A. Blair, in his work upon the Chemical Analysis of Iron, is undoubtedly a correct one, and is to be recommended. It is, however, tedious and requires several days to make the determination. The method of Mr. John E. Stead for the determination of minute quantities of aluminum in iron and steel, has given very satisfactory results, and is as follows:—

Weigh off 11 or 22 grammes of the iron or steel to be examined; the smaller quantity is preferable unless less than .01 per cent. of aluminum is expected. Dissolve the 11 grammes in 44 cc., strong hydrochloric acid, or the 22 grammes in 88 cc., on the sand bath in a 600 cc., beaker. When dissolved, evaporate to dryness, and redissolve in hydrochloric acid; filter and wash the silica. Let the total bulk of the filtrate and washings not exceed 200 cc.

To separate the alumina from the main bulk of the iron, add 3 cc. of a saturated solution of sodium or ammonium phosphate (of course, free from alumina); then add dilute ammonia till the free acid is neutralized. This point is readily known by a small quantity of phosphate of iron and alumina remaining insoluble after repeatedly shaking the solution. Add hydrochloric acid, drop by drop, till the solution is clear, and then set the beaker on the bath to boil. Add 50 cc. of sodium hyposulphite (of course, carefully tested to be free from alumina) and continue the boiling until the solution does not give off any more sulphurous acid. If there is any doubt whether or not there is excess of hyposulphite, add a few more cc., and if this does not give a precipi-

tate of sulphur, sufficient hyposulphite has been added. The smell Sulphur must not be mistaken for sulphurous acid, as the former always present. One hour's boiling will eliminate all the sulphur acid. Filter on washed filter paper (washed with hydrochloric acid and wash with boiling water to free it from all soluble iron and other salts. Dissolve all the soluble matter out of the precipitate on the filter by pouring over it 5 cc. of hydrochloric acid and 5 cc. of boiling water, allowing the solution to collect in the beaker in which the alumina was originally precipitated. Wash out of the filter all soluble matter with as little wash water as possible. The matter left on the filter should be all sulphur and may be thrown away.

The solution must now be transferred to a platinum dish from the glass beaker, and evaporated to dryness over a beaker of boiling water. When dry, add two grammes of pure sodium hydrate, free from silica (great care should be taken with reference to this re-agent to see that it is perfectly free from alumina), place the sodium on the bottom of the dish, then add about 1 cc. of boiling water to partial dissolve the hydrate of soda. Place the dish over a flame of a Fletcher rose burner until the mass is in a state of tranquil fusion. Allow to cool, and add 50 cc. of boiling water, and place the dish over a Bunsen burner and boil for five minutes. More water must be added so that the total bulk measures exactly 110 cc. Filter off the insoluble contents through a dry filter paper, which has been previously washed with acid to remove all alumina. The first portions filtered will be unclear, and must therefore be refiltered.

When 100 cc. (equivalent to 10 grammes of the 11 of steel taken in the first place) have passed through, measure off that quantity exactly and reject the insoluble matter and the remainder of the solution. Neutralise the caustic soda with hydrochloric acid until the solution reddens blue litmus paper. Add 3 cc. of sodium phosphate and the hyposulphite of soda in large excess. Boil till all sulphurous acid has been expelled, and add 3 cc. ammonium acetate, boiling for a few minutes longer and filter through a washed filter. Wash well with boiling water until the washings are free from chlorides, and ignite and weigh.

The precipitate is found to consist of $AlPO_4$, containing 22.36 per cent. of aluminum.

Determinations can readily be made by this method in 12 hour time. Very accurate results can be obtained by this method, as described in the Journal of the Society of Chemical Industry, date December 31, 1889.

Especially care must be taken that all re-agents are pure, and that the filter papers are washed free from alumina.

METHODS OF PREPARATION OF ALUMINA—THE ORE OF ALUMINUM.

As considerable inquiry has been made as to the ore from which aluminum is made, it may be well to state here that aluminum is not being manufactured from the oxide, alumina, which is purified chemically from silica and iron, from the native bauxite mineral. Bauxite is found in considerable quantities and fully as pure in quality as the best foreign mineral in the states of North Carolina and Georgia, and there are vast deposits of it in Ireland and Northern France. The average composition of bauxite is about as follows:—

	Al_2O_3	SiO_2	Fe_2O_3	H_2O	TiO_2	CaC
White from Beaux, France	58.10	21.70	3.00	14.00	3.30	trac
Brownish red from Revest, France	57.60	2.80	25.30	10.80	3.10	0.4
Oolitic from Allavet, France	55.40	4.80	24.80	11.60	3.20	0.2
White from Georgia	58.00	5.20	2.30	30.10	3.25	0.3
Redish brown from Georgia	58.70	4.80	20.50	13.20	2.10	0.4

*Authority: Dana.

†Authority: Hunt and Clapp.

The two methods of purification of bauxite are as follows:—

Bauxite, or a rich clay, chosen as free from iron as possible, roasted at a low red heat, and afterwards is treated with sulphuric acid, which combines with the alumina present, forming sulphate of alumina. This is readily dissolved by water, leaving the great bulk of silica and iron behind. The solution of sulphate of alumina allowed to settle, the supernatant liquid syphoned off into an evaporating tank, and evaporated to dryness. The dry sulphate of alumina is calcined at a red heat, driving off the sulphuric acid, leaving, as residue, anhydrous alumina. This calcination seems to be as easy as the calcination of alumina hydrate, and there appears to be no difficulty in condensing the volatilised sulphuric acid, which can be used over again. This process is easier, on a laboratory scale, than the soda carbonate method, which is about as follows:—

Bauxite is fused with carbonate of soda, in a reverberatory furnace. The fused mass is lixiviated with water, which dissolves aluminate of soda, which is decanted off. The solution of aluminate of soda decomposed by carbonic acid gas, which forms carbonate of soda which remains in solution, and the alumina hydrate is precipitated. This alumina hydrate is afterwards washed repeatedly with water, dried, and calcined at a red heat for a considerable time, which forms anhydrous alumina.

CHEMICAL ENGINEERING*

XXV1.

WEIGHING AND MEASURING.

WEIGHING also includes measuring, for what is weight a measure of the gravitation of bodies towards the gravity. Weight, so far as it relates to the force of gravity, is absolute, but weights and measures, as we use them, are both comparative. It is not with the measuring, however, that we are just now interested, but a description of standards and appliances adapted to the requirements of works' management and necessarily to Engineering.

As stated, all measurements are comparative and have to be made to some standard or settled unit; atmospheric pressure (a) is based on the pressure of a column of liquid; time (b) is measured by comparison with the linear expansion of a fluid; time (c) is reckoned by the fractional part of the mean solar day, such as the hour, minute, or second; measures of extension (d) whether linear, square, or cubic, are based on one fixed unit and standard of length at a fixed temperature. The density of a body is measured by its weight contained in a unit volume, and the specific gravity is the relative density compared with some standard substance adopted as a unit, and measured at some fixed temperature and pressure. Then we have the combined measures of extension, weight, time, and temperature, such as are required in the measurement of mechanical work.

Only standards or units we need consider are the metric, and the English or feet and pounds. The metric system has completely driven the English system from the laboratory, but we fear it will be a long time before it is in ordinary works' routine. It is, however, pleasing to find that a very simple relationship exists between the English and French systems when large weights and volumes are considered. Roughly, 1,000 kilogrammes make an English ton, and 100 kilos, or centner, or metric quintal, are hundredweight; it is therefore very easy to compare these in this measure with workings in English measures. A strange coincidence, grammes per litre of the French system is equivalent to ounces per cubic foot in English, so that experiments in the laboratory may be compared with large scale working without any variation whatever. On the English standard, the cubic foot of water at 62° F., with the barometer at 30 inches of mercury pressure, weighs 252.458 grains, when weighed against brass weights, so that the gallon contains 277.274 ounces, and weighs 10lbs. The cubic foot of water at 62° F. weighs 62.321lbs. For all practical purposes, the cubic foot of water is taken at 1,000 ounces. The correct weight in air is 997.136 ounces, and it may be thought that this correction would upset the comparison with the metric, but we have already made. This is not the case, however, the kilogramme is a cubic decimetre of water, measured at temperature of maximum density, 39° F. When, however, the water is at 62° F., and weighed against brass weights, the weight is 998.717 grammes.

Coming back to our standards or units, we have (a) the atmospheric pressure measured by the height of a column of mercury supported; that liquid is generally mercury, though alcohol and glycerine have also been employed. Measurements are given in millimetres on the French method, and in inches and tenths on the English system, so that besides the following table for easy conversion of one into the other, more is required.

THE BAROMETER IN INCHES AND MILLIMETRES.

Inches.	Ins.	Mm.
0.03937	1	25.4
0.07874	2	50.8
0.11811	3	76.2
0.15748	4	101.6
0.19685	5	127.0
0.23622	6	152.4

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Mm.	Inches.	Ins.	Mm.
7	0.27559	7	177.8
8	0.31496	8	203.2
9	0.35433	9	228.6
10	0.39370	10	254.0
50	1.96852	20	508.0
700	27.55930	30	762.0

(b.) Temperature is differently reckoned on the French and English systems; the measure is made by comparison with the dilatation of a column of mercury or any other convenient fluid, but the graduations of the scale are fixed by the freezing and the boiling points of water, or rather, the boiling point and the melting of ice. In the Fahrenheit instrument the distance traversed by the expansion of a column of mercury between these two points is divided into 180 parts, while in the Centigrade thermometer the distance is divided into 100 parts.

It is a great pity the Fahrenheit thermometer cannot be weeded out from all our manufacturing establishments, but until it is, the following table will enable comparisons to be made between the two systems:—

TEMPERATURE TABLE.

To convert ° Fahrenheit into ° Centigrade, subtract 32 and find the number corresponding to the residue.	To convert ° Centigrade into ° Fahrenheit, add 32.
1° F. 0.5555	1° C. 33.8
2° F. 1.1110	2° C. 35.6
3° F. 1.6665	3° C. 37.4
4° F. 2.2220	4° C. 39.2
5° F. 2.7775	5° C. 41.0
6° F. 3.3330	6° C. 42.8
7° F. 3.8885	7° C. 44.6
8° F. 4.4440	8° C. 46.4
9° F. 4.9995	9° C. 48.2
10° F. 5.5550	10° C. 50.0

(c.) The French system, included in its inception a centesimal measurement of time, and centesimal divisions of the circle; the day was to have been divided into 40 hours, each hour into 100 minutes, and each minute into 100 seconds, while the circle was divided into 400 grades, each grade into 100 minutes, and each minute into 100 seconds. The world, however, did not take kindly to this innovation, and the method of division derived from the old Arabian astronomers and navigators, is to-day the time and circle standard: twenty four hours to the day, while the hour and the minute each has 60 divisions. It is not necessary to give any tables for the conversion of centesimal time or divisions of the circle, to sexagesimal time or angle, and perhaps it would have been unnecessary to notice the system, were it not for the fact that the centesimal division of the circle is still explained in some elementary mathematical treatises.

(d.) Measures of extension are too firmly rooted amongst us to undergo much alteration now; the foot and the metre form the basis of nearly all the commercial transactions on the surface of the globe, the square foot and the square metre measure surfaces, while the cubic foot and the cubic metre measure solids and gases. In the manufacturing processes of this country, the measures of capacity and weight are the gallon, cubic foot, and pound; on the French system they are the litre, the hectolitre and the kilogramme, so that it will be necessary to give a few tables for the ready conversion of the one into the other, in order that metric measurements may readily be converted into English, and vice versa.

METRES AND MILLIMETRES TO FEET AND INCHES.

Metres.	Feet.	Millimetres.	Inches.
1	3.281	1	0.039
2	6.562	2	0.078
3	9.843	3	0.118
4	13.124	4	0.157
5	16.404	5	0.196
6	19.685	6	0.236
7	22.966	7	0.275
8	26.247	8	0.315
9	29.528	9	0.354
10	32.808	10	0.393

FEET AND INCHES TO METRES AND MILLIMETRES.

Feet.	Metres.	Inches.	Millimetres.
1	0.3048	1	25.4
2	0.6096	2	50.8
3	0.9144	3	76.2
4	1.2192	4	101.6
5	1.5240	5	127.0
6	1.8288	6	152.4
7	2.1336	7	177.8
8	2.4384	8	203.2
9	2.7432	9	228.6
10	3.0480	10	254.0

FRACTIONS OF AN INCH TO MILLIMETRES.

Inch.	Millimetres.	Inch.	Millimetres.
$\frac{1}{16}$	1.58	$\frac{1}{8}$	14.29
$\frac{1}{8}$	3.17	$\frac{3}{16}$	15.87
$\frac{3}{16}$	4.76	$\frac{1}{4}$	17.46
$\frac{1}{4}$	6.35	$\frac{5}{16}$	19.05
$\frac{5}{16}$	7.94	$\frac{3}{8}$	20.64
$\frac{3}{8}$	9.52	$\frac{7}{16}$	22.22
$\frac{7}{16}$	11.11	$\frac{1}{2}$	23.81
$\frac{1}{2}$	12.70	1.0	25.40

The foregoing tables will enable plans and specifications, drawn on either of the two systems under consideration, to be compared with the utmost facility. It may be advisable now to add several tables of square measure, as square metres (m^2) and square feet are very common dimensions.

METRIC SQUARE TO ENGLISH SQUARE.

Sq. Metres.	Sq. Feet.	Sq. Yards.
1	10.764	1.19
2	21.528	2.38
3	32.292	3.57
4	43.056	4.76
5	53.820	5.95
6	64.584	7.14
7	75.348	8.33
8	86.112	9.52

Sq. Metres.	Sq. Feet.	Sq. Yards.
9	96.876	10.71
10	107.640	11.90

ENGLISH SQUARE TO METRIC SQUARE.

Sq. feet.	Sq. metres.	Sq. yards.	Sq. metres.
1	0.0929	1	0.8361
2	0.1858	2	1.6722
3	0.2787	3	2.5083
4	0.3716	4	3.3444
5	0.4645	5	4.1805
6	0.5574	6	5.0166
7	0.6503	7	5.8527
8	0.7432	8	6.6888
9	0.8361	9	7.5249
10	0.9290	10	8.3610

The HECTARE is 10,000 square metres and is equal to 2.47 acres.

The English measures of capacity and solidity are the gallon and the cubic foot, and though the grain measure is used in the laboratory in some instances, yet for all scientific purposes the cubic centimetre and the litre are employed. On the metric system the large scale measure of capacity is the hectolitre and the measure of solidity the cubic metre, it will, therefore, be necessary to have a table for the ready computation of these in both systems.

CUBIC METRES AND CUBIC FEET.

Cubic metres.	Cubic feet.	Cubic feet.	Cubic metres.
1	35.317	1	0.02831
2	70.634	2	0.05663
3	105.951	3	0.08494
4	141.268	4	0.11326
5	176.585	5	0.14157
6	211.902	6	0.16989
7	247.219	7	0.19820
8	282.536	8	0.22652
9	317.853	9	0.25483
10	353.170	10	0.28315

LITRES, HECTOLITRES, AND GALLONS.

Hecto-litres.	Gallons.	Cubic feet.	Bushels.	Litres.	Gallons.	Cubic inches.	Gallons.	Hectolitres.	Litres.
1	22.009	3.53	2.7512	1	0.2200	61.028	1	0.0454	4.541
2	44.018	7.06	5.5024	2	0.4401	122.056	2	0.0908	9.082
3	66.027	10.59	8.2536	3	0.6602	183.084	3	0.1362	13.623
4	88.036	14.12	11.0048	4	0.8803	244.112	4	0.1816	18.164
5	110.045	17.65	13.7560	5	1.1004	305.140	5	0.2270	22.705
6	132.054	21.18	16.5072	6	1.3205	366.168	6	0.2724	27.246
7	154.063	24.71	19.2584	7	1.5406	427.196	7	0.3178	31.787
8	176.072	28.24	22.0096	8	1.7607	488.224	8	0.3632	36.328
9	198.081	31.77	24.7608	9	1.9808	549.252	9	0.4086	40.869
10	220.097	35.30	27.512	10	2.2009	610.280	10	0.4541	45.410

We have now only to consider the two standards of weight and see how they compare. In the metric system it is usual to compute even large weights in kilogrammes, though often they are also expressed in "centners," or metric quintals, of 100 kilos., or equivalent to 2 cwt. of the English standard. The kilogramme being equivalent to 2.20462lb. English, it will be readily seen that 1,000 kilos. are but a few lbs. short of the English ton, and that a cubic metre of water has about the same weight. The following tables from lbs. to kilos. and vice versa are all that are required :-

KILOGRAMMES AND POUNDS (AVOIRDUPOIS).

Kilos.	Pounds.	Pounds.	Kilos.
1	2.2046	1	0.45359
2	4.4092	2	0.90718
3	6.6138	3	1.36077
4	8.8184	4	1.81436
5	11.0230	5	2.26795
6	13.2276	6	2.72154
7	15.4322	7	3.17513
8	17.6368	8	3.62872
9	19.8414	9	4.08231
10	22.0462	10	4.53590

The weight of a definite volume of any liquid may be computed by means of any of the foregoing tables when the specific gravity is known. By means of the following it will be easy to find the weight of any known volume of gas, either referred to the weight of a unit volume of air or hydrogen :-

Cubic feet.	Air lbs.	Hydrogen lbs.	Cubic metres.	Air kilos.	Hydrogen kilos.
1	0.08072	0.0056	1	1.2938	0.08959
2	0.16144	0.0112	2	2.5877	0.17918
3	0.24216	0.0168	3	3.8816	0.26877
4	0.32288	0.0224	4	5.1755	0.35836
5	0.40360	0.0280	5	6.4694	0.44795
6	0.48432	0.0336	6	7.7633	0.53754
7	0.56504	0.0392	7	9.0572	0.62713
8	0.64576	0.0448	8	10.3511	0.71672
9	0.72648	0.0504	9	11.6450	0.80631
10	0.80720	0.0560	10	12.9389	0.89590
100	8.07200	0.560	100	129.3893	8.95900
1000	80.7200	5.600	1000	1293.893	89.5900

Having now the units of measurement fairly well established, we must turn to the operations wherein they will be used,

(To be continued.)

A SIMPLE STORAGE BATTERY.

half-round porous cups and a round glass jar large enough to hold two porous cups to stand in upright. Get two plates of e-sixteenth of an inch thick, wide enough to fit the half-round porous cups and deep enough to come an inch or so to the edge of the cups and jar. Solder a stout copper wire or lead to each lead plate at the top. Place the lead plates in the jar, the cups nearly full with a paste made of red lead mixed with sulphate of soda thin enough to run like a cement. Pour into the jar containing the two cups should be filled to within half an inch of the cups with sulphuric acid and water, about one part of acid to eight parts of water. One plate should be marked for charging, the currents will be correctly connected. The battery may be charged by attaching to a series of a dozen similar cells for twenty-four hours, or from a dynamo. It may be charged in same direction, and it will improve by long charges. A wooden cover may be fitted to the glass jar, and the fluid should be replenished by adding water. The cells of this battery will work small motors, lamps, and bells, and if thoroughly charged will retain a large volume of electricity for considerable time. After once being well charged, four of sulphate of copper battery will recharge it.—*Journal of Agriculture*.

AGRICULTURAL CHEMISTRY.**THE ESSEX FIELD EXPERIMENTS.**

Some years past the Essex Agricultural Society have been carrying out experiments for the purpose of determining the value of manures for special crops, these being in the charge of Mr. Dyer, F.C.S., and Mr. Edward Rosling, of Chelmsford. The results of those carried out in 1889 is now being issued to members. Two sets were carried through, the first consisting of the results of the experiments on the plots occupied by the experimental mangold in 1888, and the second of a new set of experiments on the results of mangolds. In each case the results are very instructive. In the first set of experiments, as in 1887 and 1888, no manures at all were used on the land for the oat crop itself, the object of the experiments being to ascertain the best mode of manuring oats, but to test the effect upon this crop of the course of manuring followed for mangolds which occupied the ground during the previous year. It has been afloat among farmers a general impression that the manuring of mangolds with artificials, although it may yield a profit, does so at the expense of the condition of the soil, and that the crop suffers in consequence. The experiments on this point in 1888 showed very clearly that such was not the case, but, generally, the heaviest mangolds were followed (with the exception of manuring) by the heaviest oat crops, and that even dressings of nitrate of soda on mangolds told well on the next oats, either in virtue of a portion of the nitrate remaining in the soil unexhausted or in virtue of the organic "dressing" supplied by the increased mass of decaying rootlets and tops in the soil, or nitrate-fed, mangold plots, or from both these causes. From the results it will be seen that the use of dung alone gave an increase of less than half a ton of mangolds (owing largely to partial and consequent irregularity of plant) and an increase of 12½ bushels of oats and 6 cwt. of straw. The use of artificials without dung, in addition to dung, gave nearly three tons of mangold per acre, but not an appreciably larger oat crop. Dressings including 2 cwt. of nitrate of soda, in addition to dung, gave four tons mangolds more than dung alone, three bushels more of straw, and 14 cwt. more straw. When the artificial dressing added to dung included 4 cwt. of nitrate of soda per acre, the increase over dung alone was on the average nearly 6½ tons of mangolds and 12 bushels of oats. The plots without dung, but with artificial dressings, including 4 cwt. nitrate of soda per acre, gave on an average 3½ tons mangolds, about 10½ bushels of oats, and 5 cwt. of straw per acre, more than the average of the unmanured plots. Although these results are not so satisfactory to regard as those of the previous year, the irregularity of the mangold crop, yet they clearly confirm the experience already arrived at that the heavy manuring of mangolds with artificials does not injuriously affect the land for the next crop, but, on the contrary, enriches it.

The following table shows the cost of the manures, taking dung at 10s. per ton; also the value of the increased yield of mangolds, at 10s. per ton, of oats at 2s. per bushel, and of straw at £2.

Plot.	Manure per Acre.	Cost.	Value of increase in crops as compared with no manure.
		£ s. d.	£ s. d.
*F.	12 tons dung, no artificials	3 0 0	2 1 10
J.	12 tons dung, 3 cwt. superphosphate	3 7 6	3 7 0
D.	12 tons dung, 2 cwt. nitrate of soda.....	4 0 0	4 10 9
C.	12 tons dung, 3 cwt. superphosphate, 2 cwt. nitrate of soda	4 7 6	4 12 6
M.	12 tons dung, 4 cwt. nitrate of soda.....	5 0 0	7 1 0
L.	12 tons dung, 3 cwt. superphosphate, 4 cwt. nitrate of soda	5 7 6	7 0 0
K.	12 tons dung, 4 cwt. basic cinder, 4 cwt. nitrate of soda	5 7 0	7 7 3
B.	12 tons dung, 2 cwt. guano	3 14 6	6 19 0
E.	12 tons dung, 2 cwt. guano, 2 cwt. nitrate of soda	4 14 6	5 8 0
*G.	12 tons dung, 4 cwt. guano	4 9 0	1 5 8
*H.	12 tons dung, 4 cwt. guano, 2 cwt. nitrate of soda	5 9 0	5 3 0
I.	12 tons dung, 4 cwt. guano, 4 cwt. nitrate of soda	6 9 0	5 14 0
R.	No dung, 4 cwt. nitrate of soda ..	2 0 0	3 3 6
N.	No dung, 4 cwt. basic cinder, 4 cwt. nitrate of soda	2 7 0	4 2 6
*P.	No dung, 3 cwt. superphosphate, 4 cwt. nitrate of soda	2 7 6	1 13 6
Q.	No dung, 6 cwt. guano, 4 cwt. nitrate of soda.....	4 3 6	4 5 10

*On these plots the mangold plant in 1888 partially failed.

It will be seen that on the two crops dung alone made a loss, and dung with superphosphate about paid expenses. Dung with 4 cwt. of nitrate of soda made a profit of £2. 1s. per acre, and when to the dung and 4 cwt. of nitrate 3 cwt. of superphosphate were added the profit fell to £1. 12s. 6d. per acre. Superphosphate did not answer quite so well as basic cinder. Dung and 2 cwt. of guano gave a profit of £3. 4s. 6d. per acre. The heavy dressing of 4 cwt. of guano and 4 cwt. of nitrate, in addition to dung, gave a loss on the two crops. On the no-dung plots a better result was obtained when basic cinder was coupled with nitrate—viz., £1. 15s. 6d. per acre—than when nitrate only was used, which gave a total profit of £1. 3s. 6d. Whether superphosphate or basic cinder was the better could not be told, as the superphosphate plot was not reliable, owing to the failure of the plant. In the report on the 1887 and 1888 experiments was a table of the results of the dunged plots, in which from the cost of manuring was deducted the cost of the dung, and from the value of increase in crops was deducted the value of the increase produced by dung alone. In this way the profit on the use of the artificials was made more clear and striking. A similar table is given for this series of experiments, but it is right again to remind the reader that the plot which had dung alone was a partial failure as regards the mangold crop, so that its yield does not properly show with how much manuring power the dung should throughout be credited:—

Plot.	Manure per acre.	Cost of artificials.	Value of increase in crops as compared with dung alone.
		£ s. d.	£ s. d.
J.	Dung and superphosphate	0 7 6	1 4 5
D.	Dung and 2 cwt. nitrate of soda.....	1 0 0	2 9 8
C.	Dung, 3 cwt. superphosphate, 2 cwt. nitrate of soda	1 7 6	2 11 0
M.	Dung, 4 cwt. nitrate of soda	2 0 0	4 19 1
L.	Dung, 3 cwt. superphosphate, 4 cwt. nitrate of soda	2 7 6	4 18 1
K.	Dung, 4 cwt. basic cinder, 4 cwt. nitrate of soda	2 7 0	5 5 4
B.	Dung and 2 cwt. guano	0 14 6	4 17 0
E.	Dung, 2 cwt. guano, 2 cwt. nitrate of soda	1 14 6	3 6 1
*G.	Dung, 4 cwt. guano	1 9 0	decrease
*H.	Dung, 4 cwt. guano, 2 cwt. nitrate of soda	2 9 0	3 1 2
I.	Dung, 4 cwt. guano, 4 cwt. nitrate of soda.....	3 9 0	3 12 2

* On these plots the mangold plant in 1888 partially failed.

A new scheme of mangold experiments was devised in 1889. The conclusions had in earlier experiments been weakened by partial failures of plant, owing to irregularities in the land, which caused drought to affect some parts of the field more seriously than others. To diminish the effect of discrepancies from this cause, it was resolved to have three plots under each kind of treatment to be adopted. At the same time this necessarily curtailed the scope of the experiments in other directions, for otherwise the result of the multiplication of plots would have been so great as to render them unmanageable. The land chosen was in another part of the field, in which the experimental mangolds of 1887 were grown. The roots were grown on the "ridge" system, as in previous years, the manure being sown in furrows, which, split by the plough, yielded new alternate ridges, enclosing the manure, on which ridges the seed was drilled. The sowing took place between May 6th and May 13th. The manures used were, in addition to farm-yard dung, Peruvian guano, at £7. per ton, containing nitrogen equal to 4.50 %, ammonia and phosphoric acid equal to 50.8 %, phosphate of lime, and nitrate of soda of high commercial quality, costing £9. 10s. per ton. The guano was in each case applied just before sowing. Where 4 cwt. per acre of nitrate of soda was used, the first cwt. was sown also at seed-time, the remainder being put on in successive top dressings of 1 cwt. each. Where only 2 cwt. of nitrate was used both cwt. were put on as top dressings. The dates of top dressing with nitrate were, for the 2 cwt. plots, July 20th and August 19th, and for the 4 cwt. plots, July 20th, August 19th, and September 5th. There was a partial failure of plant in the upper part of the field, owing to an attack of grub. There were three plots under each manurial treatment adopted. The following table gives the average results:—

Manure per acre.	Mangolds. Yield per acre.		
	tons.	cwts.	qrs.
No manure (mean yield of D, J, and P.).....	9	14	0
12 tons dung (mean yield of A, G, and M).....	10	10	2
12 tons dung and 2 cwt. nitrate of soda (mean yield of B, H, and N.).....	14	0	3
12 tons dung and 4 cwt. nitrate of soda (mean yield of C, I, and O.).....	15	8	3
No dung, 6 cwt. guano, and 2 cwt. nitrate of soda (mean of plots E, K, and Q).....	14	10	1
No dung, 6 cwt. guano, and 4 cwt. nitrate of soda (mean of plots F, L, and R.).....	15	13	0

In the next table is given—(1) The average increase of crop under each treatment, obtained by deducting the mean yield of unmanured plots from that of each set of manured plots. (2) The cost of manure, taking dung, as in previous reports, at 5s. per ton; and (3) the value of the grain in mangolds at 10s. per ton:—

Manure.	Increase in mangold crop.			Cost of Manure.			Value of increase.		
	tons	cwts.	qrs.	£	s.	d.	£	s.	d.
12 tons dung only	0	16	2	3	0	0	0	8	3
12 tons dung and 2 cwt. nitrate	4	6	3	3	19	0	2	3	4
12 tons dung add 4 cwt. nitrate	5	14	3	4	18	0	2	17	4
No dung, 6 cwt. guano, and 2 cwt. nitrate	4	16	1	3	1	0	2	8	1
No dung, 6 cwt. guano, and 4 cwt. nitrate	5	19	0	4	0	0	2	19	6

In each case the manure shows a greater cost than was returned in the crop, at the value taken, though the previous experience renders it safe to predict that the difference will, in most cases, be more than realised in the increase in the following grain crop.

SCHMIEDBARENGUSS—A NEW METAL.—This is a composition of pig iron, wrought iron, copper, and aluminum, bronze alloy and a flux (for which several letters-patent are now pending). It is produced direct in the cupola without annealing. It is a weldable, malleable, soft steel casting to all appearances. It has remarkable ductility and strength. It is produced at less cost than malleable iron or steel castings. It is free from detrimental impurities. It is very tenacious and homogeneous. It is distinguished from all other castings, and has remarkable characteristics. The following is a copy of test, already made by the United States Government officials:—Size of test bar 225 X 512, subjected to tensile strain of 26,200, equal to 200,766 lbs. per square inch *without breaking the test bar*. Transverse ultimate strength broke at 7,232 lbs. per square inch; length between supports, 12 inches. 29 test bars that were broken showed a reduction of area of 28 to 67 per cent.; elongation per centum 52.10; resilience 37 to 45 per cent.; compressive strength per square inch, 200,853 pounds; specific gravity, 7.16.

EXPERIMENTS ON A STEAM ENGINE, THE CYLINDER OF WHICH IS HEATED FROM THE EXTERIOR BY GAS FLAMES.

BY BRYAN DONKIN.

THE object of the following experiments is to ascertain to what degree the condensation of steam in the cylinder can be avoided, and what economy of steam may be effected by heating the cylinder externally by means of gas flames, so as to raise the temperature of its walls considerably.

The engine employed was horizontal, and with a single cylinder. The diameter of the cylinder was 0.214 metres, the length of stroke 0.405 metres. The rod of the piston was directly united to a rotary exhaustor employed in compressing air so as to use up the force supplied by the motor.

One series of experiments was made without condensing the steam at the exit of the cylinder, and a second with condensation. The amounts of water vapourised were carefully measured in all cases, and indicator diagrams frequently taken at either end of the cylinder.

The arrangement of the gas jets was a little defective, but the necessary precautions were taken throughout the experiments to obtain exact results.

Many experiments were made successively with and without flames. When the latter were employed, the amount of gas consumed was varied in different experiments. The Bunsen burners were placed very close to the exterior of the cylinder, and the flames were in contact with about one-half of its walls. A piece of asbestos cardboard, arranged concentrically with the wall of the cylinder, compelled the gases to circulate round it, and prevented loss of heat by radiation. The expansion of the steam was kept the same throughout the experiments.

RESULTS OF THE EXPERIMENTS.

The results are recorded in the following tables. It will be seen that the temperature of the cylinder, when gas flames were employed, was much above that of the steam admitted.

A considerable economy of steam is effected by the use of exterior gas heating, but the value of the gas consumed must, of course, be deducted, so that the final result, from a financial point of view, will vary from place to place, according to the prices of fuel and of gas.

Since the completion of these experiments a better arrangement of gas-burners for heating the cylinder has been adopted. Professor Dwelshauver Dery, of the University of Liege, has carefully calculated the results obtained by this new way of heating the cylinder, and has compared them with those given by two other arrangements intended to reduce condensation in the cylinder. This was attempted by Willan by increasing the speed of the piston, whilst the same object was aimed at in Hirn's experiments by superheating the steam. The comparison of the efficacy of these three methods is interesting.

PRINCIPAL RESULTS OF THE EXPERIMENTS.

TABLE I.

Results of experiments made on a steam engine of 6 h.p., *without condensation*, with and without external heating of the cylinder by means of gas-burners, made at Bermondsey in 1888:—

	Without Gas Flames.		With Gas Flames.	
	Experiments.....	3	6	9
Dates in 1888	26/7	28/7	31/7	31/7
Duration of experiment..	4 hours.	4 hours.	—	3 hours.
Water evaporated—per H.P., per hour, in kilos.	20.139	15.421	15.337	15.337
Horse power—indicated on the diagrams	6.25	6.17	6.33	6.31
London gas—burned at Bunsen burners—litres per hour	0	1386	1132	991
Temperatures—at the exterior of the cylinder in degrees C.	120	212	—	168.8
Pressure of steam above that of the atmosphere:				
In the boiler, in kilos.	2.50	2.46	2.50	2.42
In the cylinder „	2.23	2.45	2.45	2.39
Velocity—revolutions per minute	90.73	90.79	89.7	90.1
Total revolutions	21,776	21,790	16,146	16,218
Steam used per H.P. from diagram, with 8/10 admission ..	15.874	15.600	15.457	—
Pressure utilised of steam introduced	80	101	101 3/4	—

TABLE I.—The engine, without condensation, with and without gas.—A comparison of experiments 3 and 9 shows that there is a saving of 24 % in the amount of water vaporised per horse power per

hour, when the cylinder is heated, and that this result is obtained with the same pressure at the boilers, the same expansion, and the same rate of working. It will be observed that the exterior temperature of the wall of the cylinder is much greater when the burners are lighted, than when they are extinguished. The initial pressure of steam in the cylinder indicated by the diagrams is also about 10 % higher with gas than without; the weight of the steam utilised, according to the diagram, with 8/10 expansion, is only 80 per cent. of the total quantity admitted, so that it follows from the experiments that, without gas, 20% of the steam is condensed, while with gas, the diagrams show that all the water vaporised acts in the cylinder, and there is no loss.

TABLE II.

Results of experiments on a steam engine of 6 h.p. with condensation, with and without external heating of the cylinder by gas burners, made at Bermondsey in 1888:—

	Without flames.	With flames.	
Experiments	4	3	2
Dates, 1888	9/8	9/8	8/8
Duration	3 hours	3 hours	3 hours
Water evaporated—kilos. per h.p. per hour	17.461	13.924	13.743
H.P. shown by diagrams	5.61	6.05	5.47
London gas—burned by Bunsen burners in litres per hour	0	990	792
Temperatures—at the exterior of cylinder in degrees C.	101°	114°	115°
Pressure of steam above that of air in boiler, in kilos.	2.46	2.42	2.42
Pressure of steam above that of air in cylinder, in kilos.	1.03	1.07	0.915
Velocity—revolutions per minute..	92.27	93.66	90.16
Total revolutions	16,680	16,680	16,230
Steam utilised—steam utilised per h.p. according to diagram with 8/10 admission	12.699	12.382	12.382
Steam utilised—percentage utilised of total steam admitted	73.4	89	90

Table II.—Engine with condensation, with and without gas.

Experiments 2 and 4 show an economy of 21 per cent. on the amount of water vaporised per h.p. and per hour, when the cylinder is heated, other conditions being practically the same. The external temperature of the cylinder is also higher with gas.

The initial pressure in the cylinder is greater with gas. Calculating from the diagram it is found that only 73 per cent. of the steam admitted is utilised when the cylinder is not heated, whilst 90 per cent. is utilised when heat is applied, a saving of 17 per cent. being thus effected. A comparison of Tables I. and II. shows that the useful effect of heat applied to the cylinder is greater without than with condensation. Experiments in which the delivery of the burners employed was increased, show that after the cylinder has reached a certain temperature, increase of heat does not increase the economy. It is probable that the excess of heat is radiated to the exterior, and is partially absorbed by the extractor connected with the cylinder.

Some experiments were made at a rate of 45 revolutions, which also showed an economy when heat was applied, but to a much less extent than when the engine was working at 90 revolutions.

Messrs. Woodhouse & Rawson, Limited, have decided to open a branch warehouse and show room in Johannesburg, which will be under the management of Mr. R. Lewis Cousens, M.I.E.E., late Electrician to the Kimberley Town Council. Special attention will be paid to the carrying out of such work as the lighting of cities, hotels, mines, docks, railways, etc., the transmission of power for running stamps, tramways, light railways, telfer transport, etc., and the depot itself will be stocked with a most complete assortment of engineering and electrical requisites of the latest types.

INCREASING PRODUCTION OF SALT IN AMERICA.—Kansas promises to develop into an important competitor of New York. Michigan, Ohio and West Virginia, as a producer of salt. According to the *Engineering and Mining Journal* but one small plant in Kingman County, Kan., produced any salt in 1888, while in the following year seventeen companies were in operation, the total output for 1889 being 19,056 tons in bulk and 547,254 barrels. This was the production of four counties. The rapid development of such beds as these is a strong argument against the possibility of controlling the production of salt in America on the principle that has proved so successful in England. By the way, we believe the projectors of the "great American salt company" promised that it would be in successful operation by the beginning of this year. Nearly three months of the year have already gone and we have heard nothing to indicate that the scheme is to be revived.

IMPORTANT NOTICE.

SPECIAL EXHIBITION NUMBER

OF THE

"CHEMICAL TRADE JOURNAL."

The issue for April 19th will appear as a Special Exhibition Number with a largely increased circulation.

Each Exhibit will receive a detailed notice, descriptive of the goods shewn.

As this number will possess unusual advantages as an advertising medium, it is particularly advisable that application for space should be made as early as possible in order to avoid disappointment.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

ELMORE'S COPPER WIRE.—On this subject *The Electrical Review* states that one way to compete with this electrolytically formed copper wire of high conductivity would be to give the purchaser a slightly greater weight of conductor than he actually asks for. That is to say, if the company recently formed to exploit Mr. Elmore's process thinks it is going to secure the monopoly of the wire market by producing a material with a two or three per cent. greater conductivity than other manufacturers can supply, the deficiency will be made up by competitors giving a slightly greater weight of copper. Naturally these remarks are based upon the assumption that the Elmore wires will be priced like other copper in the market, for if higher, users will find it cheapest in the long run to use, so far as conductivity is concerned, slightly inferior copper, of somewhat heavier weight.

SOCIETY OF CHEMICAL INDUSTRY.

GLASGOW AND SCOTTISH SECTION.

THE annual general meeting of this section took place on the 1st inst., in the rooms of the Society, Bath-street, Glasgow. The chairman, Mr. R. R. Tatlock, presided. Being the occasion of the annual re-adjustment of the official list of the section, the chemical papers arranged for presentation were briefer than is customary. Mr. Tatlock read a short reference to some experiments he had been making on the fatty acids of olive and other oils, with a special application to soap manufacture, regarding which the interim chairman, Mr. Stanford, expressed a hope that, as the speculations arising out of these partial experiments were highly interesting in character, Mr. Tatlock might at some early date present to the Society an exhaustive exposition of the subject. Thereafter, Mr. James Hope read a paper on "The estimation of cobalt and nickel," which was accepted by the meeting as a valuable contribution so far, but this also proved to be of the nature of an instalment, Mr. Hope holding himself pledged to resume the subject and carry it farther in a future paper. The proposals of the Committee as to the re-arrangement of the official list were then put to the meeting by the Chairman, and carried unanimously, the new order not to come in force, however, till the end of June, according to the custom of these appointments. Mr. E. C. C. Stanford becomes chairman, *vice* Mr. R. R. Tatlock, retiring; Prof. Dittmar, Mr. G. G. Henderson, and Mr. W. J. Chrystal, continue severally in the vice-chairmanship, the hon. secretaryship, and the hon. treasurerhip; and the new members of committee are Messrs. W. J. A. Donald, C. A. Fawcitt, J. Falconer King, T. P. Miller, J. Pattison, and R. R. Tatlock. Proceedings were brought to a close by the reading of the annual report of the secretary on the year's record and present condition of the section. Removals by death, change of residence, &c., have been very heavy, amounting to 28 in all; but the new nominations have been pretty numerous also, 23 in number, so that the membership remains at about the old strength, namely, 240. During the session 14 papers were presented, and there was an average membership attendance of 30.

MANCHESTER SECTION.

The annual meeting of the Manchester section of the Society of Chemical Industry was held on the evening of April 2nd, in the Victoria Hotel. Mr. I. Lewinstein presided. After the election of the committee for the ensuing year, Dr. Bailey described a new method of analysis, and Mr. H. Grimshaw made a communication on the decomposition of chlorides of magnesium, calcium, and zinc by heat—three substances which, he said, were extensively used for processes which involved their application to cotton and woollen fabrics. His experiments had been directed to ascertain at what temperature and how low a temperature decomposition took place. The result of his experiments was to show that the only one of the three chlorides which suffered decomposition was the chloride of magnesium, which parted with a portion of its acid, thus affecting the colour and strength of the cotton and woollen fibres.

TANNING WITH EXTRACTS.

MONS. VILLON has the following remarks on tanning extracts in his treatise on "The Manufacture of Leather":—"Extracts, as we have previously said, are tanning materials from which the aqueous matter has been extracted. The real utility of extracts is for materials containing less than 10 per cent. of tannin; but some manufacturers for export use substances which are richer in tanning. The extracts of commerce come to the consumer under three forms: 20° Baumé, 30°, and solid. We reject entirely the employment of solid extracts, which are of no advantage, and give too much colour to the leather. We do not advise the employment of 30° Baumé, except in very special cases; it is better to use from 20 to 25° Baumé, which are the least coloured and the least falsified. The quality of extracts is also presented in three forms to the tanner: ordinary extracts, which are made without any manipulation, and which precipitate abundantly in cold; clarified extracts, from which the matters soluble in cold have been removed; the uncoloured and clarified extracts, which seldom yield the results that one expects from them generally. We should then choose ordinary extracts, which are well made, without too much colour, and concentrated in a vacuum.

"The dissolving of commercial extracts ought to be done in a pit heated to 30° of temperature, with a circular copper steam-tube. The liquid is pumped through a cask containing new tan on a double bottom, which acts as a filter. The clear liquor is received in a reservoir. Do this until the liquor registers 10° Baumé. The deposit which is formed ought to be removed, because it remains

completely inert in the operations of tanning; while, of course, when tanning, every part of the extract should be dissolved, and the temperature in the pelt should never exceed 25°, so it would not be possible to dissolve matters which have been put into contact with water at 30°. Always, with solid extracts, one is obliged to dissolve by ebullition; but, we repeat it, don't use solid extracts, however well manufactured."

Trade Notes.

THE LARGEST NICKEL MINE IN THE WORLD.—On a little branch of the Canadian Pacific road, near Sudbury, Canada, is a nickel mine that produces more nickel, it is said, than the entire market of the world calls for. It is found at a depth of about 300 feet below the surface, in a layer of oxydised Laurentian rock characteristic of that region. Immediately the mineral is hoisted from the mine it is broken up and calcined for the purpose of eliminating the sulphur it contains. When this process is completed the residuum is conveyed to the smelter. After the dross of the molten metal flows off, the nearly pure nickel and copper are blended together, forming an alloy, 70 per cent. of which is nickel, and 30 per cent. copper, which it draws off at the base of the furnace and allowed to cool. When cold, the product is shipped to Swansea, Wales, and Germany, where the constituent metals are separated and refined by secret process, known only to the manufacturers, and jealously guarded. The present output of the mine is stated at 4,000 tons of nickel annually.

CHROMIUM IN DYING.—The quantity of chromium fixed on the fibre is (says a writer in a contemporary) a most important matter in connection with the fastness to light of logwood blues and blacks. If more than a certain amount is present, the black, in a short time, is most likely to turn green. In all cases of logwood blacks that have turned green, which the writer has examined, an excess of chrome has been found. It is difficult to state a limit, since much depends upon the condition in which it exists, but not more than 1.5 per cent. of bichromate of potash should be fixed upon the fibre. Where the goods are chromed after dyeing, as well as before, with the object of making the wool clean, there is no doubt that part of the chromium is often fixed on the fibre as chromate or chromic acid; and such being the conditions, the black is very liable to turn green. It is most probable that in after-chroming a finishing by the use of too much bichromate of potash, the logwood black is rendered liable to turn green. If chromic acid is deposited on the fibre in the first chroming, it is all probably reduced to chromic oxide when it comes into the logwood.

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

Business in the alkali trade continues very active—manufacturers are very fully engaged with orders, and prices all round are satisfactory. Bleaching powder remains nominally at £5. 7s. 6d. per ton, on rails and makers generally are firm, notwithstanding that some re-sales have been made below this figure. Caustic soda has been somewhat irregular but for 70's the general quotation is £10. 5s. f.o.b., and for 60's £9. 7s. 6d. to £9. 10s. Recent stoppages at works have reduced stocks, and the prospect of an early demand from continental markets strengthens the position. The demand for soda ash continues good all round, and ordinary carbolic and caustic ash cannot be obtained under 1½d. per deg. f.o.b. Carbonate 58% ash, strong at 1 15-32d Soda crystals £2. 17s. 6d. f.o.r. Saltcake 27s. 6d. per ton, in bulk Sulphur without change. Chlorate of potash steady at 5d. Super phosphate of lime 26/28%, ruling at £2. 10s. to £2. 12 6d. at works and makers are readily filling up with orders at these prices. Sulphate of copper still scarce for early deliveries, and £26. to £26. 10s paid this week. The future of this article remains uncertain, and forward quotations range from £20. to £24. per ton, according to period of delivery. Lead acetates and nitrate are slow of sale, but prices remain firm. Acetates of lime are more freely offered at £8 and £13. 15s. per ton respectively, for brown and grey. Other acetates and acetic acids quiet and prices stationary. Carbolic acid are dull, with a tendency to lower prices. Aniline oil and salt are firmer again, in sympathy with an upward move in benzol. Oxalic acid is difficult to find at 3¼d. net. Prussiate of potash quiet, but price firm at 9¼d. Bichromates and chromic acid without change. Muriate of ammonia stagnant in consequence of reduced consumption but an early resumption of normal demand is expected. Potash caustic, and carbonate are meeting with ready sale, and prices are firm. Green copperas is in active demand, and supplies are fully taken up. General business in chemicals, and especially in the fine goods of the trade is quiet, and prices are unsatisfactory as a consequence.

METAL MARKET REPORT.

	Last week.		This week.
.....	48/11	....	48/9
.....	£90 5 0	....	£90 0 6
r	47 12 6	....	48 0 0
r	21 0 0	....	20 12 6
.....	12 10 6	....	12 10 0
.....	43½d.	....	44d.

COPPER MINING SHARES.

	Last week.		This week.
into	15½ 16	....	16½ 16¼
1 & Barry	6½ 6½	....	6½ 6½
is	4½ 4½	....	4½ 4½
Copper Co. ..	3½ 3½ x.d.	....	3½ 3½
qua	1¾ 2	....	1¾ 2
po	2½ 2½ x.d.	....	2½ 2½
illo	1 1½	....	1 1½
Quebrada	¾ 1	....	¾ ¾
la	2½ 2½	....	2½ 2½
illa	1/- 1/6	....	1/- 1/6
atella	3d. 9d.	....	3d. 6d.

REPORT OF MANURE MATERIAL.

been a good prompt business passing, notwithstanding, but prices have been the turn in favour of buyers, both for nitric and nitrogenous material.

shippers continue to invite offers for Charleston River rock under 11d. per unit, cost, freight, and insurance, for the United Kingdom, but the syndicate, being sold a good way to be firm in their quotation of 11d. For Charleston 11½d. would be accepted, and probably ¼d. less for goods, freights being somewhat easier. We have no alteration in values of either Belgian or Somme phosphates. Quotation continues without change, but they are quite above the United Kingdom buyers, though sales of the higher qualities are resumably for the Continent. Prices for Florida phosphate hardly yet to be fixed, and most of what is coming forward is distributed among buyers mainly for trial purposes.

still nothing to report in River Plate cargoes of bones to the end of the December cargo referred to in our last report not arrived at port of call, and buyers being indisposed to bid time. Sales of crushed East India bones have been made at £5. 3s. 9d. per ton, ex quay, up to £5. 5s., the latter required for further quantity. No business reported to the Bombay bone meal sold at £5. 10s. per ton, ex quay at which price further quantity may be had ex quay, lowest ex store. There have been sales made of common bones at £4. 17s. 6d. up to £5., the lower price being, per unit, value for fair ordinary quality, considerable quantities a way or having arrived.

soda continues without change, though on the Continent has made some advance. Spot price is 8s. per cwt. Due worth 7s. 10½d. to 8s., according to size and quality. For the present considerably more money is required, the very large amount far this year encouraging the hope that the position of this be considerably improved before next season.

els of roughish River Plate dried blood sold at 9s. 6d. per ton, Liverpool: 10s. 3d. required for fine parcels, and so far accepted for fine quality. For home prepared 10s. 9d. per unit, nearest value, with a somewhat slower sale per unit, in bags, gross weights, delivered f.o.r. at works accepted for ground hoof.

mainly without change at 38s. to 40s. per ton, in bags, as to rails, according to quantity.

phosphates are somewhat better, most of the parcels in second-hand on the market, having been sold at 46s. 3d. per ton, bulk, delivered f.o.r. at works, is again the nearest value.

THE LIVERPOOL MINERAL MARKET.

market has continued strong, and in some minerals a still increase has been experienced. Manganese: Arrivals are less continue to be made at advanced figures. Magnesite: Lump continues large, and prices are in buyers' favour, £6. 10s.; and calcined ground, £10. to £11. Bauxite

(Irish Hill brand): The strong demand continues, and prices remain very firm—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals this week have increased, all of which, however, have gone direct into consumption, and prices remain firm, especially for G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105s. superfine. Barytes (carbonate) continues easier, selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., and specially selected lump, finest quality, £13. Iron ore in demand at full prices. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in strong demand at 18s. to 24s. Purple ore steady at last quotations. Spanish manganese ore selling freely at good prices. Emery-stone: Best brands continue scarce both for spot and forward delivery; prices firmer. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High grades are inquired for, and bring full prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grades, £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore firm at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel in good demand at stronger figures. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Steady, prices unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23.; Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

All paraffin products, with the continued exception of burning oil alone, incline to the strengthening side, and scale and wax in free hands fetch prices slightly higher than those at which makers are now delivering under their lately signed time contracts. Were it not for the backward position of burning oil, matters would be looking brighter for the Scotch oil companies; but the burning article in a sense is the one by which their undertakings stand or fall, and when it continues to droop uninterruptedly for a season, there is sure trouble ahead. Dividend declarations for the year are due within a week or two, and it is certain that some of the concerns will this time have nothing to declare but loss. Two or three of the better equipped ones will come out of the ordeal fairly well; but in no case will the affluent dividends of former days be repeated, or even approached. The general chemicals market has been on the down grade during the week, but partly owing to the stoppage of transactions for Monday's holiday, there is no increase of turnover to report. The easier prices ought, however, to influence the bulk of the business done between now and next week. Buying and selling in sulphate of ammonia have been somewhat disorganised owing to the closed days, but there is sufficient to indicate a further weakening of the article, and to-day's price is no more than

£11. 10s. Makers have been offering for forward delivery at £11. 15s., but most likely are ready to accept less. Chief prices current are:—Soda crystals, 52s. 6d., less 2½% Glasgow; alum in lump £5., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¾d. net Tyne; caustic soda, white, 76°, £13., 70/72°, £10. 7s. 6d., 60/62° cream, £9., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1¾d., net Tyne; saltcake, 30s.; bleaching powder, £5. 10s. to £5. 15s., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 5d., less 5% any port; nitrate of soda 8s. to 8s. 3d.; sulphate of ammonia, spot, £11. 10s., f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25. 10s., less 5% Liverpool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¾d. to 7d. at Glasgow for Scotch consumption (English orders done at about 1d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 10s. to £8. Week's imports of sugar at Greenock were 70,272 bags.

TAR AND AMMONIA PRODUCTS.

The benzol market retains its firmness, and 50/90's have been sold at 2s. 7½d., and 90's stand as quoted last week. There is every expectation of this market retaining its present position, as there are no disturbing elements in the horizon. Solvent naphtha is exceedingly firm, as also is creosote, while anthracene is still a very gloomy picture. Pitch remains weak, and 28s. on West Coast, and 29s. to 29s. 6d. on East Coast ports may be called to-day's prices.

The sulphate of ammonia market after experiencing some irregularity appears now to be settling down to a more steady condition, and parcels which have been pressing have mostly been cleared out, and a better feeling is therefore noticeable. It has been stated that £11. 10s. f.o.b. Hull, was accepted last week, but this could only have been an exceptional transaction. To-day's values are £11. 12s. 6d., Hull, £11. 10s. to £11. 12s. 6d., Leith, and £11. 10s. f.o.b. Liverpool. There is no doubt this drop has been caused by the Leith makers losing their heads at a time when additional firmness was required. There have also been transactions at a low price in Liverpool by dealers who should have known the state of the market better, and it is a well-known fact that dealers have offered parcels on the Continent at 5s. per ton below prices which they have offered producers on this side.

THE TYNE CHEMICAL REPORT.

TUESDAY.

The chemical market has been very quiet this week, with little business doing on 'Change owing to the holidays. Prices remain much about the same as last week. Nitrate of baryta has been advanced 5s. a ton. Caustic soda 77%, £13 per ton; bleaching powder, £5. 15s. to £6 per ton, softwood casks; soda ash, 48—52%, 1¾d. per degree, less 2½%; soda crystals, £2. 12s. 6d. per ton; sulphate of soda, in bulk, 35s. per ton; ground, in casks, 45s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 5d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, in 1 cwt. kegs, £5. 15s. per ton, in 5—7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—all f.o.r. makers' works or f.o.b. Tyne.

Small coals continue in good demand, and prices remain very firm. Northumberland steam small quoted 8s. to 8s. 6d. per ton, and Durham small, 10s. per ton.

The exports of chemicals from the Tyne for the first three months of this year show a considerable increase in tonnage over the exports for the same period of last year.

	1889.		1890.
	Tons.		Tons.
Alkali and soda ash ..	2,702	.....	3,704
Bicarb. soda	26	.....	24
Bleach powder	3,911	.....	6,424
Manure	1,963	.....	2,955
Soda crystals	2,989	.....	3,303
Sulphate of soda	187	.....	1,107
Other chemicals	3,761	.....	4,911
	15,539		22,428

Gazette Notices.

Partnerships Dissolved.

HILTON, ANDERSON AND CO., Faversham, Upnor, and Halling, and U; Thames-street, London, manufacturers of Portland, Roman, and other ceme as far as regards P. Hilton.

P. OVENDEN, C. RHIND, J. FOSTER, and R. M. DOUGLAS, under the styl the Malago Vale Ochre and Colour Company, Bristol, ochre and col manufacturers and merchants.

D. Y. CLIFF, C. CLIFF, P. CLIFF, and B. CLIFF, under the style of J. Cliff Sons, Runcorn and Leeds, chemical apparatus manufacturers and fireb merchants, as far as regards P. Cliff and B. Cliff.

The Bankruptcy Act, 1883.

Receiving Orders.

WALTER SLOCOMBE, Romford, oil and colourman.

New Companies.

INTERNATIONAL EXHIBITION OF MINING AND METALLURGY.—This comp was registered on the 31st ult., as a company limited by guarantee to £1. e member to establish and maintain an exhibition, in or near London, of mining, metallurgy. The word "limited" is omitted from the title by Board of T licence. The subscribers are:—

H. C. Gray, 130, Lothian-road, N., railway clerk.

Hy. Eve, 18, Finch-lane, business manager, *Mining Journal*.

G. A. Ferguson, 18, Finch-lane, editor *Mining Journal*.

W. Pritchard Morgan, M.P., Dolgelly.

Hy. Cribb, Bishop's Stortford.

T. R. R. Jordan, 15, George-street, E. C., engineer.

E. C. Bennett, M.E., 20, Bucklersbury.

OTTOMAN PAPER MANUFACTURING COMPANY, LIMITED.—This company registered on the 27th ult., with a capital of £325,000., divided into 16,250 prefer shares, 16,150 ordinary, and 100 founders' shares of £10. each, to acquire all or of the shares in the capital stock of a Société Anonyme constituted in the Ottom Empire, for acquiring a concession from the Sultan of Turkey for the construct and working of a paper manufactory in His Majesty's dominions. There an signatories, who take amongst them 23 founders' shares, the first seven being:—

The Hon. E. W. Douglas, Christchurch

Lord Clinton, 32, Bruton-street

J. C. Thynne, The Cloisters, Westminster

H. W. Cobb, Salisbury

J. Judd, J.P., St. Andrew's Hill

Herbert Spicer, 165, Queen Victoria-street

W. H. Richardson, J.P., Jarrold

VICTORIA PETROLEUM COMPANY, LIMITED.—This company was registered the 28th ult., with a capital of £10,000. in £10. shares, to import, export, and manufacture, and deal in mineral, vegetable, or animal oils. The subscribers are:—

R. Johnston, Cardiff, merchant

J. Milligan, Liscard, accountant

S. Woodhead, Oxtou, freight manager

A. H. Woodhead, Oxtou, cashier

J. Caesar, Walton, accountant

A. E. Wills, Seaford, freight manager

E. J. Corney, 9, Tynwald-hill, Liverpool, bookkeeper

The Patent List.

This list is compiled from Official sources in the Manchester Techn Laboratory, under the immediate supervision of George E. Davis, Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Briquettes or Block Fuel. T. C. Fawcett and J. B. Swallow. 4,542. Marc Dynamas.—(Complete Specification). F. V. Andersen and J. O. Girdlest 4,551. March 24.

Tin Refining. T. Teague. 4,560. March 24.

Apparatus for Extracting Juices from Fruits. J. Coppard. 4,562. Marc Gas and Petroleum Motors.—(Complete Specification). E. Kaselowsky. 4, March 24.

Grey Colouring Matters. O. Imray. 4,577. March 24.

Manufacture of Carbonate of Magnesium and Double Carbonate Magnesium and Potassium. H. Precht. 4,588. March 24.

Improved Steam Boiler. W. Hornsby and R. Edwards. 4,589. March 24

Kilns for Firing Glass and Enamel Ware. H. T. Parfitt. 4,592. Marc

Separating Liquids or Solids from Gases. E. Jones. 4,594. March 24.

Manufacture of Sulphonated Thionines. S. Pitt. 4,596. March 24.

Manufacture of Gas. W. Gray. 4,598. March 24.

Electric Switches. A. A. C. Swinton. 4,605. March 25.

Transparent Flexible Films for Photography. J. Leslie. 4,606. Marc

Filtering Oil. W. E. Crane. 4,607. March 25.

Smoke Consumption. J. Dean and H. Powell. 4,613. March 25.

Drying Apparatus. M. Guthrie. 4,614. March 25.

Photometers. F. Greene and F. H. Varley. 4,622. March 25.

Water Heaters and Steam Condensers. C. E. Masterman. 4,643. Marc

Dynamas. P. F. Degn. 4,648. March 25.

Purifying Brine.—(Complete Specification). J. C. Mewburn. 4,652. Marc

Electrical Soldering.—(Complete Specification). H. H. Lake. 4,657. Marc

Electrical Heating Devices for Forging Machines.—(Complete Specificat

O. Imray. 4,670. March 25.

The Welding of Metals.—(Complete Specification). R. J. Tieford. 4, March 25.

The Dyeing of Yarns.—(Complete Specification). A. J. Boulton. 4,683. Marc

Concentrating Magnetic Iron Ore.—(Complete Specification). H. J. Had

4,690. March 25.

Production of Salts from Brine. E. G. Lawrence. 4,694. March 25.

Apparatus for Drying Salt. E. G. Lawrence. 4,695. March 25.

Closing Vessels to promote Sterilization. E. Sonstadt. 4,701. March 2

Measuring Apparatus for Liquids. J. W. White. 4,707. March 26.

Smoke Consumption. R. M. Whitaker. 4,708. March 26.

- Steam Generators. G. W. Hart. 4,709. March 26.
 Construction of Sewers. H. L. Doulton. 4,712. March 26.
 Filtering Sewage. W. Birch. 4,712. March 26.
 Cement Kilns.—(Complete Specification). W. A. Gibbs. 4,741. March 26.
 Electrical Apparatus. A. Essinger and T. P. C. Crampton. 4,745. March 26.
 Fermenting Process in Rarefied Air-Space. S. Joseph and H. Citron. 4,746. March 26.
 The Production of Fine Salt from Brine. E. A. Cowper. 4,751. March 26.
 Extraction of Silver from Copper Products. D. Cameron. 4,752. March 26.
 Apparatus for Drying Sugar Cane Trash.—(Complete Specification). A. J. Boulton. 4,754. March 26.
 The Production of Hydrate of Magnesia. H. Precht. 4,759. March 26.
 Boiler Furnaces. J. Gasteiger. 4,764. March 26.
 Electromotors and Dynamos. J. V. Sherrin. 4,767. March 26.
 Lamp for Burning Gas from Benzoline and other Spirits. J. D. Carr. 4,773. March 27.
 Fuel Economisers.—(Complete Specification). T. Sykes. 4,778. March 27.
 The Treatment of Salt Preparatory to its Decomposition by Sulphurous Acid. B. H. Thwaite. 4,780. March 27.
 Apparatus for Using Waste Gases from Steam Boiler Flues.—(Complete Specification). J. Schmitz. 4,781. March 27.
 Instrument for Measuring Electrical Currents. W. H. Douglas. 4,791. March 27.
 Manufacture of Nitrate of Ammonium. C. A. Burghardt. 4,793. March 27.
 Hydrometers, Saccharometers, and Lactometers. G. C. Topp. 4,802. March 27.
 Vacuum Drying Apparatus for Explosives. H. J. Haddan. 4,808. March 27.
 Manufacture of Soap.—(Complete Specification). J. Y. Johnson. 4,809. March 27.
 Insulated Electric Conductors. E. F. A. Obach. 4,821. March 27.
 Extraction Apparatus for Fatty Substances. H. A. A. Dombrain. 4,822. March 27.
 Armatures for Dynamos. J. Nebel. 4,824. March 27.
 Preventing Spontaneous Ignition of Coal Cargoes. V. B. Lewis. 4,826. March 27.
 Furnaces for Melting, Heating, and Welding. R. N. Oakman. 4,831. March 27.
 Treatment of Sewage. J. Price. 4,836. March 27.
 Apparatus for Weighing and Measuring Volume and Density of Bodies.—(Complete Specification). E. Chameroy. 4,840. March 27.
 Multiplying the Illuminating Powers of Electric Lights. W. Andrews. 4,846. March 28.
 Machines for Dyeing, Bleaching, etc. W. E. Heys. 4,854. March 28.
 Multipolar Dynamos. G. Kapp. 4,858. March 28.
 Chemical Fire Engines. J. C. Merryweather. 4,864. March 28.
 Manufacture of Dyestuffs. S. Pitt. 4,904. March 28.
 Galvanometers. J. Perry. 4,921. March 28.
 Water Gauges. J. Dewrance and G. H. Wall. 4,924. March 29.
 The Use of Compressed Gases for Illuminating Purposes. The Manchester Oxygen Co. Ltd., and W. M. Jackson. 4,928. March 29.
 The Preparation of Indigo. W. Hay, W. M. Alexander, and E. Bents. 4,930. March 29.
 Electrical Batteries. W. Balch and S. S. Bromhead. 4,943. March 29.
 Production of Ethylether of Cinnamic Acid. O. Imray. 4,945. March 29.
 Electrolytic Solution for Galvanic Batteries.—(Complete Specification). L. Weigert. 4,949. March 29.
 The Distillation of Ammoniacal Liquors. A. W. Ellis. 4,950. March 29.
 Boilers for Manufacture of Cellulose. C. Kellner. 4,959. March 29.
 Purifying Paper Pulp. C. Kellner. 4,960. March 29.
 Electric Meters. R. Kennedy. 4,974. March 31.
 Esparto Boilers. G. W. Hawksley. 4,976. March 31.
 Illuminants for Electric Lamps. H. G. Nichols. 4,993. March 31.
 The Extraction of Chromium.—(Complete Specification). A. K. Eaton and K. A. Vanderbilt. 5,003. March 31.
 Clarifying and Bleaching Tannin Extracts. A. Foelsing. 5,004. March 31.
 Electrical Meters. G. F. Redfern. 5,023. March 31.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.							
Week ending April 1st.							
Alum—		France, 5 pks.	J. Puddy & Co.	" 10 chts.	W. Isted.	Dyestuffs (otherwise undecorated)	
Holland, £30	Ohlenschlager Bros.	Portugal, 3 "	B. & F. Wf. Co.	" 3	Ernsthausen & Co.	A. Turkey, 125 pks.	
" 25	"	Holland, 8 "	"	" 33	L. & I. D. Jt. Co.	Gutta Percha—	
Antimony Ore—		Spain, 13	W. C. Bacon & Co.	" 4	W. Isted	Germany, 17 c.	Kaltenbach & Schmitz
France, 10 t.	Fillow, Jones, & Co.	Portugal, 2	B. & F. Wf. Co.	" 9	Frauling & Goschen	E. Indies, 100	"
Acetic Acid—		France, 5	M. Ashby	Germany, 11	Chalmers, Guthrie, & Co.	" 357	"
Holland, 72 pks.	Dunn & Co.	" 5	E. W. Carling & Co.	E. Indies, 23	L. & I. D. Jt. Co.	B. Guiana, 31	Jackson & Till
Germany, 16	Lister & Biggs	" 43	B. & F. Wf. Co.	" 7	F. Stahlschmidt & Co.	E. Indies, 250	Hultenbach & Co.
Arsenic—		" 43	N. S. S. Co., Ltd.	" 151	W. Balchin	Holland, 61	Kleinwort, Sons, & Co.
Germany, £125	Burgoyne, Burbidge, & Co.	Sydney, 101 t.	W. H. Pridham & Co.	" 205	Indigo Co.	E. Indies, 640	J. H. & G. Sordal
Bromide of Iron—		Caustic Potash—		Annatto		Glucose—	
Germany, £400	A. & M. Zimmermann	Germany, 16 pks.	W. Balchin	Norway, 1 pkg.	Johnsen & Jorgensen	Germany, 10 pks. 20 c.	M. D. Co.
" 400	"	Caustic Soda—		Ceylon, 2	Hoare, Wilson, & Co.	" 200	Fellows, Mortimer & Co.
Bones—		Belgium, 255 c.	Beresford & Co.	Extracts		" 200	200 J. Barber & Co.
Victoria, 8 t.	Anning & Cobb	Chemicals (otherwise undecorated)		France, 250 pks.	Levinstein & Sons	" 800	820 T. H. Lee
U. S., 12	A. & W. Nesbitt	Germany, £45	T. H. Lee	Holland, 75	J. Forsey	" 3	34 M. D. Co.
B. W. L., 1	Culverwell, Brooks, & Co.	" 25	Phillips & Graves	" 26	W. Balchin	U. S., 110	120
Victoria, 3	L. & I. D. Jt. Co.	" 30	L. & I. D. Jt. Co.	France, 50	B. & F. Wf. Co.	France, 300	300 De Paiva, Normant & Co.
E. Indies, 100	J. Mitchell	" 12	C. Brumlen	" 95	L. J. Levenstein & Sons	Germany, 25	210 J. Cooper
" 600	Gonne, Croft, & Co.	Germany, 97	T. H. Lee	Belgium, 100	B. Kuhn	" 5	25 Pillow, Jones & Co.
Barium Chloride—		" 198	A. & M. Zimmermann	U. S., 1	Laughlin & Co.	" 400	400 Trier, Meyer, & Co.
Germany, £100	J. Knill & Co.	Holland, 6	Beck & Pollitzer	Austria, 800	A. J. Humphrey	" 25	200 W. Balchin
Barytes—		" 10	Phillips & Graves	U. S., 60	T. Ronaldson & Co.	" 100	120 L. & I. D. Jt. Co.
Germany, 59 cks.	H. Lambert	Germany, 5	A. & M. Zimmermann	Denmark, 1	Petty & Co.	" 45	290 Props. Chubb & Welf
Belgium, 131	A. Zumbach & Co.	" 250	A. & M. Zimmermann	Norway, 3	Johnsen & Jorgensen	U. S., 240	240 H. A. Litchfield & Co.
Holland, 69	A. Boltz	" 406	Phillips & Graves	Aniline		" 87	531 R. G. Hall & Co.
" 23	Props. Scott's Whf.	" 12½	Becker & Ulrich	Holland, 5 pks.	R. Baelz & Co.	Guano—	
" 44	W. Harrison & Co.	France, 15	C. Brumlen	Belgium, 10	Union Lighterage Co.	Belgium, 30 t.	Ang. Cont. Guano Wks. Agency
Germany, 19	Litchfield & Co.	Germany, 23	F. Stahlschmidt & Co.	Sumac		Glycerine—	
Caoutchouc—		Dyestuffs—		Italy, 100 pks.	F. Roberts	Victoria, £173	J. Connell & Co.
E. Indies, 50 c.	N. S. S. Co., Ltd.	Yellow Berries		France, 1 pkg.	Brown & Elmslie	Germany, 114	Beresford & Co.
Belgium, 31	Lewis & Peat	France, 30 pks.	Arnati & Harrison	Saffron		Holland, 450	Spies, Bros., & Co.
E. Africa, 1¼	"	Indigo		E. Indies, 32 pks.	Lewis & Peat	Isinglass—	
U. S., 20	Kebbel, Son, & Co.	E. Indies, 17 chts.	Elkan & Co.	Myrabolams		B. W. L., 1 pkg.	L. & I. D. Jt. Co.
E. Indies, 33	Arbuthnot, Ewart, & Co.	" 69	Patry & Pasteur	E. Indies, 500 pks.	A. Hagan	China, 9 pks.	W. M. Smith & Son
" 18	Caldwell, Watson, & Co.	" 17	Stahlschmidt & Co.	Cutch		Magnesia—	
France, 10	Flageollet & Co.	" 7	L. & I. D. Jt. Co.	E. Indies, 500 pks.	Middleton's S. S. Whf.	Holland, £40	Beresford & Co.
Germany, 10	H. Grey, jun.	" 89	N. S. S. Co. Ltd.	Gambler		Manure—	
E. Indies, 200	Huttenbach & Co.	" 32	Benecke, Souchay, & Co.	E. Indies, 554 pks.	S. Barrow & Bro.	Germany, 19 t.	Petri Res Perkins & Homert
Holland, 49	Heilbut, Symons, & Co.	" 50	Arbuthnot, Latham, & Co.	Germany, 274	Vonder, Meden, Bros., & Co.	Phosphate Rock	
E. Africa, 1¼	L. & I. D. Jt. Co.	" 79	W. Brandt, Sons, & Co.	Divi Divi		France, 168 t.	Lawes Manure Co.
Cream of Tartar—		" 25	Elkan & Co.	B. W. Indies, 316 pks.	G. T. Benton & Sons	Belgium, 160	D. de Pass & Co.
Spain, 5 pks.	B. & F. Wf. Co.	U. S., 3	Patry & Pasteur	Tanners' Bark		" 200	F. C. Hills & Co.
" 16	W. C. Bacon & Co.	E. Indies, 47	L. & I. D. Jt. Co.	Belgium, 10 t.	C. S. Lovell	" 192	London Manure Co.
" 6	Christopherson & Co.	" 30	Elkan & Co.	" 50	Boutcher & Co.	France, 170	Ang. Cont. Guano Wks. Agency
		" 33	Stansbury & Co.	" 10	H. Henle's succrs.	Manure (otherwise undecorated)	
		" 342	L. & I. D. Jt. Co.	" 31½	J. J. Williamson & Sons	Germany, 50 t.	F. W. Beck & Co.
		" 122	Arbuthnot, Latham, & Co.	" 10½	Leach & Co.	U. S., 4½	C. A. & H. Nichols
		" 22	Parsons & Keith	Victoria, 26	Baxter & Hoare		
		" 11	Walker, Munsie, & Co.	Orchella			
		" 9	F. H. Allen & Co.	Ceylon, 25 pks.	E. Barker & Co.		
				E. Indies, 3	C. C. Bryden & Co.		

Manganese Borate—

Germany, £25 Petri Brs.

Nitre—Chile, 13,761 cubic bgs. Ang. Contl.
Guano Wks. Agency**Naphtha—**Germany, 2 drs. H. Lorenz
" 2 brls. L. & I. D. Jt. Co.
Belgium, 31 Domeier & Co.**Potassium Oxymuriate—**

Belgium, 100 pks. G. Boor & Co.

Potassium Sulphate—

Germany, 500 pks. Hunter, Waters & Co.

France, 14 Carey & Sons

Germany, 63 H. Lambert

Paraffin Wax—

U.S., 200 brls. G. H. Frank

" 6,193 J. H. Umar & Co.

" 236 H. Hill & Sons

" 140 112 cs.

Potassium Carbonate—

Germany, 11 pks. Northcott & Sons

Pearl Ash—

France, 200 c. F. W. Berk & Co.

Holland, 8 brls. Poth, Hille & Co.

Germany, 70 Berlandina Brs. & Co.

Plumbago—

Holland, 17 cs. Brown & Elmslie

" 36 cs. J. Barber & Co.

Pyrites—

Spain, 2,193 t. C. Tennant, Sons & Co.

Pomaron, 1,000 Mason & Barry, Ltd.

Spain, 1,909 C. Tennant, Sons & Co.

Saltpetre—

Germany, 43 cs. Craven & Co.

E. Indies, 327 L. & I. D. Jt. Co.

" 387 Clift, Nicholson & Co.

" 1,092 C. Wimple & Co.

" 327 L. & I. D. Jt. Co.

A. Turkey, 17 cs. Brown & Elmslie

Salammoniac—

Holland, £50 Barr, Moering & Co.

Sodium Sulphate—

Holland, £50 Prop. Dowgate Dk.

Sodium Acetate—

France, £75 S. F. Waters & Co.

" 146½ A. Zumbeck & Co.

Stearine—

Germany, 400 cs. Ross & Deering

Tartars—

Italy, 43 pks. B. Jacob & Sons

Tartaric Acid—

Holland, 12 pks. B. & F. Wf. Co.

France, 4 Augspurg, Hopf & Co.

Holland, 23 B. & F. Wf. Co.

" 4 Moering & Co.

Germany, 12 C. Andrae & Co.

Tinical—

E. Indies, £120 J. Puddy & Co.

Ultramarine—

Germany, 19 cs. G. Steinhoff

Holland, 4 Hernu, Peron & Co.

Belgium, 6 cs. W. Harrison & Co.

Holland, 11 pks. Hernu, Peron & Co.

" 4 cs. Ohlenschlager Brs.

Zinc Oxide—

U.S., 12 pks. W. Harrison & Co.

Holland, 130 M. Ashby

" 165

Germany, 100 cs. D. Storer & Son

" 98 M. Ashby

Zinc Sulphate—

Germany, £65 F. Smith

GLASGOW.

Week ending April 3rd.

Albumen—

Rotterdam, 3 brls. J. Rankine & Son

Barytes—

Rotterdam, 114 cs.

Dyestuffs—

Alizarine

Rotterdam, 80 cs.

" 185

Sumac

Rouen, 100 bgs.

Hamburg, 13 cs.

New York, 100 brls.

Glycerine—

Rotterdam, 8 cs. J. Rankine & Son

Magnesium Silicate—

New York, 480 bgs. £250

Potash—

New York, 2 cs. Hurlet and Campsie

Rotterdam, 20 Alum Co.

Dunkirk, 9 brls

Potassium Carbonate—

Hamburg, 12 cs.

Pyrites—

Seville, 1,081 t. Tharsis Co.

Huelva, 1,600

Sodium Nitrate—

Junin, 9,158 bgs. Thomson Aikman

Salt—

Hamburg, 1,060 bgs.

Sodium Acetate—

Rouen, 10 cs.

Sulphur Ore—

Drontheim, 220 t.

Saltpetre—

Rotterdam, 7 cs. J. Rankine & Son

Tar—

Wilmington, 1,500 brls.

Ultramarine—

Rotterdam, 10 cs. J. Rankine & Son

Zinc Oxide—

Rotterdam, 20 cs. J. Rankine & Son

LIVERPOOL

Week ending April 2nd.

Antimony—

Havre, 1 cs.

Antimony Ore—

Smyrna, 50 bgs.

Marseilles, 1,050 bgs.

Acetate of Lime—

New York, 2,488 bgs.

Acids (otherwise undescribed)—

Leghorn, 30 cs.

Bones—

Bombay, a quantity.

Smyrna, 246 t. J. Jowett & Sons

Constantinople, 65 bls. Jivan, Tekian, & Co.

Smyrna, 208 t.

Bombay, a quantity

Kurrachee, 8,813 bgs. Ralli Bros.

504 W. & R. Graham & Co.

Bone Meal—

Bombay, 1,200 bgs.

" a quantity.

Kurrachee, 1,000 bgs. Ralli Bros.

122 W. & R. Graham & Co.

Borax—

Havre, 135 cs.

Carbolic Acid—

Havre, 10 bskts.

Caoutchouc—

Manaos, 1,683 cs.

Akassa, 722 bgs. Royal Niger Co.

Accra, 11 cs. J. P. Werner

" 12 C. Lane & Co.

" 5 Davies, Robbin, & Co.

" 1 cs. Edwards Bros.

Salt Pond, 2 cs. 3 brls. 2 pks.

" 1 W. Griffiths & Co.

" 3 S. & C. Nordlinger

" 5 Edwards Bros.

" 4 Pickering & Berthoud

" 1 Radcliffe & Durant

" 1 Davies, Robbins, & Co.

" 1 brl. Tomlinson & Co.

" 3 W. B. McIver & Co.

" 4 Lintott Bros. & Co.

" 7 A. Miller Bros. & Co.

Cape Coast, 3 cs. S. Henrichson & Co.

" 3 L. Hart & Co.

" 4 W. Griffiths & Co.

" 5 A. Millerson & Co.

" 2 Davies, Robbins, & Co.

" 6 A. Miller & Co.

" 3 C. Friere

" 3 Ihlers & Bell

" 10 W. Duff & Co.

" 5 J. Smith & Co.

" 1 Tomlinson & Co.

" 2 H. B. W. Russell

" 3 W. B. McIver & Co.

" 12 1 cs.

" 3 C. L. Clare & Co.

" 1 H. C. Nordlinger

" 6 Fletcher & Fraser

Dixlove, 1 brl. 1 cs. F. & A. Swanzy

Axim, 3 bgs.

" 2 Edwards Bros.

" 1 Radcliffe & Durant

" 1 A. Miller & Co.

" 1 M. L. Levin

" 2 Pickering & Berthoud

Assinee, 3 brls. Millward, Bradbury, & Co.

" 1 cs. W. D. Woodin

" 1 A. Verdier

Grand Bassam, 2 bgs. T. E. Tomlinson

" 1 A. Miller, Son, & Co.

" 1 Grimwade, Ridley, & Co.

" 3 Pickering & Berthoud

" 1 W. D. Woodin

" 2 Openheimer Bros.

" 1 M. Ridyard

" 1 W. Cornel Bank

" 1 bt. 1 brl. F. & A. Swanzy

Sierra Leone, 23 brls. Pickering & Berthoud

" 52 pns. 24 brls. Comp. Francaise

" 12 3 Broadhurst & Co.

" 44 pks. Paterson, Zachonis, & Co.

" 1 ck.

Conakry, 3 pks. 3 brls. A. Cros & Co.

" 12 pns. 2 Cie Francaise

Ceara, 39 bls. Leech, Harrison, & Co.

Cobalt Ore—

Valparaiso, 127 sks. A Gibbs & Sons

Copper Ore—

Valparaiso, 17 bgs. Balfour, William-son, & Co.

" 727 Brownells, Lewis, & Co.

Cream of Tartar—

Barcelona, 5 hds. Wright, Crossley, & Co.

" 10

Tarragona, 3 cs.

Barcelona, 14 hds.

Chemicals (otherwise undescribed)

Rotterdam, 19 cs.

Dyestuffs—

Sumac

Palermo, 100 bgs. H. Rooke, Sons, & Co.

Barcelona, 100

Palermo, 50

" 50 bls.

Annatto

New York, 3 brls.

Divi Divi

New York, 50 bgs.

" 220 W. Clucas

Juan Guigo, 33 t. D. Midgley & Son

Logwood

Jamaica, 476½ t. Muhl Pardo & Co.

Valonia

Smyrna, 97 t.

Saffron

Valencia, 1 cs.

Myrabolams

Bombay, 408 bgs.

" 2,749 D. Sassoon & Co.

" 316 B. Craig & Co.

" 200

" 3,876 D. Sassoon & Co.

" 1,133 Ralli Bros.

Indigo

Bombay, 4 pks.

Extracts

Rouen, 35 cs. R. J. Francis & Co.

New York, 50 brls.

Boston, 340 bxs.

Havre, 1 ck.

Argols

Bordeaux, 101 cs.

Oporto, 22 cs. G. Bank of London

Fustic

Barcelona, 1,989 ps. Muhl Pardo & Co.

Orchella

Lisbon, 7 bls. A. Barbosa & Co.

Alizarine

Rotterdam, 6 cs.

Cochineal

Grand Canary, 29 bgs. Lathbury & Co.

Glycerine—

Rotterdam, 10 crbys. 8 dms.

Glucose—

New York, 90 brls.

" 549

Iodine—

Valparaiso, 9 brls. W. & J. Lockett

Manganese Ore—

Bordeaux, 6 cs.

Oxalic Acid—

Rotterdam, 4 cs.

Phosphate

Oñent, 700 bgs.

Pyrites—

Huelva, 1,490 t. Tennar

" 1,620 Mathes

" 1,379

" 2,046

Phosphoric Acid—

Bremerhaven, 6 cs.

Potassium Bicarbonate—

Rotterdam, 8 cs.

Potash—

Rouen, 21 dms. Co-op. W'sale

Portland, 30 brls.

Sodium Silicate—

Rotterdam, 2 cs.

Sodium Nitrate—

Iquique, 11,037 bgs. Graham,

Rouen, 21 dms. Co-op. W'sale

Tartaric Acid—

Rotterdam, 13 cs.

Ultramarine—

Rotterdam, 8 cs. 4 cs. 1 bx.

Zinc Oxide—

Antwerp, 25 brls.

Marseilles, 97 bgs. 8 brls.

Rotterdam, 55 cs. O. & H.

HULL.

Week ending April 3rd.

Acid (otherwise undescribed)</

Phosphorus —	Rouen, 10 cs.	Rawson & Robinson
Phosphate —	Ghent, 160 t.	Wilson, Sons, & Co.
Pyrites —	Huelva, 422 t.	J. Dalton, Holmes, & Co.
Pitch —	Bordeaux, 55 cks.	
Sulphur —	Rotterdam, 40 cs.	G. Lawson & Sons
Soda —	Rotterdam, 4 cks.	"
Sodium Nitrate —	Rotterdam, 3 cks.	Hutchinson & Son
Stearine —	Rotterdam, 108 bgs.	G. Lawson & Sons
Turpentine —	Bordeaux, 11 cks.	Rawson & Robinson
Tartar —	Bordeaux, 2 cks.	"
Tar —	Marseilles, 29 cks.	Wilson, Sons, & Co.
	" 25	

TYNE.		
<i>Week ending Apr. 3rd.</i>		
Acetic Acid —	Rotterdam, 5 crbys.	Tyne S. S. Co.
Barytes —	Rotterdam, 86 cks.	Tyne S. S. Co.
Copper Precipitate —	Pomaron, 4,248 bgs.	A. P. Harrison & Co.
Glucose —	Hamburg, 100 bgs.	12 cks. Tyne S. S. Co.
Phosphate —	Antwerp, 220 t.	Blaydon Manure Co.
Pyrites —	Huelva, 1,378 t.	Scott Bros.
Saltpetre —	Hamburg, 2 cks.	Tyne S. S. Co.
Sulphur Ore —	Pomaron, 1,050 t.	A. P. Harrison & Co.

GOOLE.		
<i>Week ending Mar. 26th.</i>		
Alum —	Rotterdam, 12 cks.	
Caustic Potash —	Calais, 40 drums.	
Dyestuffs —	Logwood, Rotterdam, 4 cks.	
	Alizarine, Rotterdam, 35 cks.	
Dyestuffs —	(otherwise undecorated) Boulogne, 26 cks.	33 cs.
Glucose —	Hamburg, 200 bgs.	2 cks.
	Dunkirk, 220	
Manure —	Phosphate Rock, Ghent, 800 bgs.	
Plumbago —	Boulogne, 27 cks.	
Potash —	Dunkirk, 15 cks.	23 drums.

Pyrites —	Huelva, 1,781 t.
Salt —	Hamburg, 324 cks.
Saltpetre —	Hamburg, 100 bgs.
	Rotterdam, 270
Soda —	Rotterdam, 5 cks.
Tartaric Acid —	Rotterdam, 12 cks.

GRIMSBY.*Week ending March 29th.*

Albumen —	Hamburg, 2 bgs.
	Antwerp, 7
Chemicals —	(otherwise undecorated) Hamburg, 21 pks.
Glucose —	Hamburg, 24 cks.
	100 bgs.
Zinc Ashes —	Antwerp, 16 cks.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.***Week ending March 29th.*

Acids —	(otherwise undecorated)
	Cologne, 300 btl.
	Reval, 100 cs.
	Demerara, 6 crbys.
Alum —	Salonica, 20 t.
Alum Cake —	Calcutta, 172 cks.
Arsenic —	B. Ayres, 1 t. 10 c.
Ammonium Sulphate —	Hamburg, 150 t.
	Ghent, 35
	" 30 11 c.
	Hamburg, 60 19
	Ghent, 15
	Demerara, 5 17
	Berlice, 3
	Demerara, 20
Ammonia —	B. Ayres, 30 cs.
Acetic Acid —	Cape Town, 5 c.
Ammonium Carbonate —	Halifax, 20 cs.
Copper Sulphate —	Lisbon, 5 t. 11 c.
	Genoa, 10 t.
	Treport, 7 8 c.
	Bordeaux, 3 3
	Malta, 2
	Salonica, 1
Clarifiers —	Bordeaux, 55 cks.
Caustic Soda —	Lisbon, 5 t.
	Natal, 10 c.
	Algoa Bay, 1 5
	B. Ayres, 5 16
Citric Acid —	Rotterdam, 3 cs.
	Hamburg, 2 cks.
	Copenhagen, 10 kgs.
	Brussels, 10 c.
	Libau, 8 1/2
	B. Ayres, 4 1/2
	Genoa, 5
	Melbourne, 10 kgs.
	Bombay, 1 cs.
Chemicals —	(otherwise undecorated)
	Melbourne, 15 pks.
	Yokohama, 40 cs.
	Melbourne, 22
	New York, 13 pks.
Cream of Tartar —	Sydney, 2 cs.
	Wellington, 3
	Solmes, 5
	" 5

Carbolic Acid —	Bombay, 5 t.
Coal Products —	Tar
	St. John's, Nfld. 100 brls.
	Sydney, 51
	Dunkirk, bulk
	Havre, bulk
	Dunkirk, bulk
	Havre, 35 cks.
	Mauritius, 10 brls.
	Calcutta, 24 rults.
	St. John's, Nfld. 89
	Natal, 30 drms.
	Mauritius, 10 brls.
	Sydney, 20
	Bombay, 96 rults.
	Calcutta, 100
Anthracene —	Cologne, 252 cks.
	Rotterdam, 450
Benzol —	Hamburg, 20 drs.
	Rotterdam, 24
Naphthalene —	New York, 11 cks.
	Marseilles, 12
	Hamburg, 9
	Treport, 55
Disinfectants —	Paris, 154 gls.
Guano —	Demerara, 50 t.
	" 12 6 c.
	Berlice, 6 7
	Hamburg, 10 4
Manure —	Gothenburg, 186 t. 2 c.
	Dunkirk, 11 10
	Hamburg, 49 5
	" 100
	Rouen, 27 10
	Bordeaux, 60
	Barbadoes, 50
	Antigua, 30
	Guadeloupe, 15
	Ghent, 130
	Rotterdam, 58 11
	Hamburg, 21 19
Nitric Acid —	Algoa Bay, 3 cs.
	Cape Town, 5
Oxalic Acid —	New York, 3 t. 18 c.
	Lisbon, 13
	Algoa Bay, 10 cs.
	Antwerp, 5 t. 16 c.
	Yokohama, 1,282 lbs.
Phosphoric Acid —	Mauritius, 28 t.
Potassium Chlorate —	Sydney, 5 t.
Saltpetre —	Melbourne, 5 t.

Superphosphate —	Cherbourg, 330 t.
Salicylic Acid —	Brisbane 1 cs.
Strontium Nitrate —	New York, 17 c.
	" 3 t. 18
Sulphuric Acid —	Durban, 1 t. 10 c.
	Penang, 1 17
Sheep Dip —	Algoa Bay, 28 pks.
	E. London, 50 cs.
	" 340 gls.
	Algoa Bay, 50 cs. 1,750 drs.
Sulphur Flowers —	Lisbon, 250 brls.
	Adelaide, 5 t. 1 c.
Salammoniac —	Salonica, 1 t. 19 c.
	E. London, 1 5
	Shanghai, 5
Sulphur —	Brisbane, 6 t. 10 c.
	Madeira, 4 4
Soda Crystals —	Hong Kong, 3 t. 10 c.
	Sydney, 10 14
Sodium Bicarbonate —	Calcutta, 3 t.
	Wellington, 2 10 c.
Tartaric Acid —	Auckland, 5 c.
	Wellington, 5
	Sydney, 5
	Townsville, 5

LIVERPOOL.*Week ending April 1st.*

Alum Cake —	Philadelphia, 6 t. 16 c. 1 q.
Antimony Regulus —	Alexandria, 2 c.
	Hamburg, 1 t. 5 c.
Ammonium Carbonate —	Hamburg, 1 t.
	Toronto, 15 c. 3 q.
	New York, 14 6 3
	Bombay, 1 5
Alum —	Bombay, 9 t. 4 c.
Ammonium Muriate —	Philadelphia, 21 t. 8 c.
	Christiana, 7 3 q.
Ammonium Sulphate —	Demerara, 56 t. 15 c.
	Hamburg, 146
	Antwerp, 16
	Rotterdam, 50
	Las Palmas, 5 2 1
	Valencia, 75 19 3

Bleaching Powder —	Amsterdam, 11 cks.
	Barcelona, 10
	Bombay, 5 cs.
	Boston, 402
	Ghent, 132
	Havana, 50
	Rotterdam, 3
	Santander, 10
	Barcelona, 20
	Boston, 121
	Genoa, 24
	Havre, 25
	Montreal, 5 bxs. 30
	San Sebastian, 11
Boracic Acid —	Genoa, 1 t. 1 q.
Borax —	Christiana, 3 t. 11 c.
	Rouen, 24 4
	Ihrail, 1 10 3 q.
	Adelaide, 1 3
Borax Salts —	Havana, 1 t. 4 c.
Caustic Soda —	Antwerp, 20 drms.
	Boston, 200
	Cape Town, 30
	Constantinople, 34
	Cochimbo, 60
	Galaiz, 30
	Havana, 50 kgs.
	Ihrail, 30
	Malaga, 25
	Marseilles, 28
	Matanzas, 70
	New York, 700
	Odessa, 100
	Vigo, 10
	Corunna, 11 brls.
	Amsterdam, 141 bxs. 1
	Antwerp, 28
	Barcelona, 390
	Bilbao, 10 17
	Boston, 200
	Cartagena, 15 40 kgs. 25
	Ceara, 10
	Genoa, 55
	Hamburg, 15
	La Guayra, 30
	Madrid, 100
	Montreal, 30
	New Orleans, 50
	New York, 513
	Oporto, 54
	Philadelphia, 100
	Rio Janeiro, 25 cs.
	San Sebastian, 100
	Seville, 240 50 kgs.
Caustic Potash —	Montreal, 4 c.
Copperas —	Seville, 2 t. 4 c.

Carbolic Acid—

Genoa, 9 c. 3 q. £65

Copper Sulphate—

Genoa, 2 t. 13 c. £47

Adelaide, 20 12 574

Marcella, 7 12 190

Barcelona, 17 1 3 q. 336

Bilbao, 4 19 129

Bordeaux, 6 8 2 155

Santos, 1 19 1 51

Valencia, 10 1 240

Barcelona, 4 18 3 100

Pasages, 10 1 260

Trieste, 5 19 1 130

Venice, 45 9 1 886

Genoa, 5 1 125

Tarragona, 20 2 1 400

Barcelona, 10 2 178

Bordeaux, 9 4 189

Venice, 7 17 1 167

Calcium Chloride—

New York, 25 t. 10 c. £64

Honolulu, 11 cs. £7

Baltimore, 30 t. 14 c. 1 q. 130

New York, 10 30

Disinfectants—

Baltimore, 10 cs. £57

Calcutta, 5 c. 10

Epsom Salts—

Seville, 20 brls. 36

Guanos—

Havana, 499 t. 5 c. 2 q. £4,241

Philadelphia, 12 t. 18 c. £310

Magnesium Chloride—

Bombay, 10 t. 3 c. £27

Manure—

Havre, 200 t. 4 c. 3 q. £660

Picric Crystals—

New York, 2 t. 5 c. £311

Phosphorus—

Shanghai, 100 lbs. £7

Potassium Bichromate—

Naples, 1 t. 2 c. £43

Yarmouth, 4 3 q. 9

Potassium Chromate—

Genoa, 5 t. 2 c. £135

Potassium Carbonate—

Bombay, 10 c. 1 q. £14

Potassium Chlorate—

Hamburg, 1 t. 5 c. £52

Oporto, 2 10 93

Toronto, 7 16

New York, 12 10 564

Hamburg, 2 84

Havana, 2 93

Kobe, 25 1,200

Naples, 10 25

Rotterdam, 16 34

Stockholm, 5 233

Vera Cruz, 4 10

Amsterdam, 5 12

Phosphate—

Cape Town, 5 t. 1 c. £12

Sodium Bicarbonate—

Amsterdam, 41 kgs. 93

Barcelona, 100 150 cks 50 brls. 100

Boston, 10 100

Havana, 20 1

Malaga, 20 74

Hamburg, 500

Kobe, 500

Mayaguez, 20

St. John's, 50

Seville, 50

Soda Crystals—

New York, 747 kgs. 280

St. John's, Nfld., 95 kgs. 20 brls. 20

Boston, 280

Seville, 20

Soda Ash—

Baltimore, 330 cks. 255 tcs. 419

Boston, 200

New York, 4 419

Oporto, 16 666

Philadelphia, 146 28

Ceara, 5 brls. 192

Genoa, 146

New York, 6

Seville, 21

Venice, 21 cks.

Sodium Silicate—

Bilbao, 20 brls.

Cartagena, 65

Oporto, 25

Seville, 100

Salt—

Boston, 116 t. 2

Callao, 150 4 c. 15 cs.

Pernambuco, 120

Portland M., 50

Sierra Leone, 103½

Sydney, 50

Banana, 18

Bonny, 50 cs. 12

Iquique, 103

Melbourne, 14

Boma, 95

Cameroon, 8 c. £10

Ceara, 2 t. 5 49

Hamilton, 8 10

Mexico City, 1 t. 11 3 q. 34

Almeria, 1 t. 11 3

Sulphur—

Belize, 5 brls. £5

Boston, 50 t. 2 c. 200

Vera Cruz, 10 2 q. 12

Port Alegre, 2 19 16

Saltcake—

Philadelphia, 37 t. 18 c. £81

Baltimore, 105 1 184

Sheep Dip—

Alcoa Bay, 5 t. £200

Salammoniac—

Aleppo, 5 c. £10

Naples, 10 2 q. 18

Philadelphia, 3 19 139

Galatz, 1 t. 4 32

Leghorn, 1 9 15

Strontia, 1 4 3 41

Sodium Biborate—

Rouen, 67 t. 3 c. £694

Hamburg, 9 t. 15 c. 1 q. £263

Rio Janeiro, 5 3 9

Tar—

Honolulu, 150 brls. £25

Zinc Chlorate—

Canada, 1 t. 3 c. 3 q. £75

Zinc Sulphate—

Hamburg, 4 t. 18 c. £75

TYNE.

Week ending April 3rd.

Alkali—

Amsterdam, 5 t. 4 c. 50

New York, 50 11 3

Gothenburg, 2 3 18

Christiania, 4 18

Genoa, 4 8

Leghorn, 8 5

Rotterdam, 9 9

Copenhagen, 2 14

Antimony—

New York, 15 t. 15

Christiania, 2 6 c. 10

New York, 15 15

Arsenic—

Venice, 10 t. 7 c. 50

Ammonium Sulphate—

Hamburg, 50 t. 50

Nykjobing, 5 5

Barium Chloride—

Genoa, 1 t. 1 c. 7

Barytes—

Antwerp, 3 t. 18 c.

Barytes Nitrate—

Amsterdam, 36 t. 2 c.

Bleaching Powder—

Amsterdam, 206 t. 2 c.

Gothenburg, 1 7

Antwerp, 61 19

Hamburg, 26 3

Christiania, 12 8

Bergen, 5 6

New York, 174 16

Copenhagen, 13 11

Newfairwater, 81 19

Danzig, 3 1

Caustic Soda—

Amsterdam, 2 t. 18 c. 101

New York, 101 11

Gothenburg, 21 17

Antwerp, 8 2

Genoa, 18 17

Barcelona, 19 9

Barcelona, 30

Gypsum—

New York, 35 t. 11 c. 1

Hydrochloric Acid—

Huelva, 78 lbs. 1

Litharge—

Amsterdam, 3 t. 15 c. 1

Hamburg, 1 1

Rotterdam, 1 19

Magnesia—

New York, 2 t. 4 c. 7

Hamburg, 1 7

Barcelona, 4 12

Potassium Bicarbonate—

Huelva, 10 lbs. 1 t. 17 c.

Potassium Bichromate—

Rotterdam, 1 t. 1 c. 1

Potassium Chlorate—

Antwerp, 1 t. 10

Phosphorus—

Barcelona, 1 t. 12 c. 1

Soda—

Leghorn, 9 t. 6 c. 5

Naples, 7 18

Nakskov, 12 9

Nykjobing, 37 9

Amsterdam, 5 7

New York, 486 19

Copenhagen, 20 5

Soda Ash—

Genoa, 3 t. 18 c. 702

New York, 702 3

Venice, 20 15

New York, 98 17

Newfairwater, 40 3

Sodium Hyposulphate—

New York, 14 t. 1 c. 1

Sodium Hypsulphite—

Genoa, 1 t. 9 c. 1

Salammoniac—

Genoa, 1 t. 5 c. 1

Sodium Nitrate—

Gothenburg, 1 t. 10 c.

Sodium Bicarbonate—

Amsterdam, 1 t. 10 c. 1

Sulphuric Acid—

Huelva, 120 lbs. 120

Sodium Sulphate—

New York, 110 t. 15 c. 15

Sodium Bichromate—

New York, 9 t. 10 c. 1

Tar—

Hamburg, 5 t. 1

Malmo, 1 q. 1

GLASGOW.

Week ending April 3rd.

Ammonium Sulphate—

Nantes, 5 t. 3½ c. £60

Bleaching Powder—

Sydney, 121 c. £40

New York, 978 25 lbs. 405

Rouen, 106 38

New York, 1,070½ 390

Copper Sulphate—

Rouen, 383 c. £475

Bergen, 12½ 15

Caustic Soda—

Rouen, 295 c. £107

Iodine—

Philadelphia, 6,702 lbs. £4,022

Litharge—

Halifax, 15 t. 3½ c. £251

Boston, 15 104 225

Potassium Bichromate—

Gothenburg, 210½ c. £365

Rouen, 31 t. 17½ 1,039

Gothenburg, 7 227

Halifax, 83 155

Venice, 43¾ 90

Rotterdam, 2 cks. 30

Amsterdam, 13 190

New York, 501 c. 936

Antwerp, 460 669

Paraffin Wax—

Sydney, 29 t. 16 c. £804

Rouen, 7 8½ 180

Nantes, 9 9 245

Pitch—

Santander, 1,020 t. £24

Potassium Prussiate—

Halifax, 12½ c. £24

Soda Ash—

Baltimore, 100 cks. £

Buenos Ayres, 100 cks. £

Sodium Bichromate—

Rouen, 12 t. 4 c. £

Antwerp, 26

Sodium Silicate—

Sydney, 5 t. 6 c. 1

Superphosphate—

Barbadoes, 49 t. 16 c. £

Sulphuric Acid—

Bombay, 177 t. 12 c. £1,

HULL.

Week ending April 1st.

Chemicals (otherwise undscribe)

Antwerp, 24 cs. 9 cks. 300 pks.

Amsterdam, 11 161 slbs.

Bremen, 30 156 cks.

Christiania, 17 15 pl

Dunkirk, 47

Genoa, 22 9

Gothenburg, 25 25

Hamburg, 2

Harlingen, 20

Kongsberg, 625

PRICES CURRENT.

WEDNESDAY, APRIL 9, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
25 % and 40 %	per cwt	7/6	& 12/9
Glacial	"	67/6	
ic, S.G., 2000°	"	0 12	9
nic 82 %	nett per lb.	0 0	6 1/2
ic	"	0 0	3 1/2
itic (Tower Salts), 30° Tw.	per bottle	0 0	8
(Cylinder), 30° Tw.	"	0 2	11
80° Tw.	per lb.	0 0	2
us	"	0 0	1 1/2
C.. .. .	nett	0 0	3 1/2
.. .. .	"	0 1	4
uric (fuming 50 %	per ton	15	10 0
(monohydrate)	"	5	10 0
(Pyrites, 168°)	"	3	2 6
(, 150°)	"	1	8 0
(free from arsenic, 140/145°)	"	1	10 0
urous (solution)	"	2	15 0
ic (pure)	per lb.	0 1	0 1/2
ric	"	0 1	2 1/2
white powdered	per ton	13	0 0
oose lump)	"	4	15 0
ulphate (pure)	"	5	0 0
(medium qualities)	"	4	10 0
um	per lb.	0 15	0
ia, 880=28°	per lb.	0 0	3
=24°	"	0 0	1 1/2
Carbonate	nett	0 0	3 1/2
Muriate	per ton	23	0 0
(sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-
Nitrate	per ton	41	10 0
Phosphate	per lb.	0 0	10 1/2
Sulphate (grey), London	per ton	11	12 6
(grey), Hull	"	11	12 6
Oil (pure)	per lb.	0 0	11 1/2
Salt	"	0 0	9 1/2
iy	per ton	75	0 0
(tartar emetic)	per lb.	0 0	1 1
(golden sulphide)	"	0 0	10
Chloride	per ton	8	0 0
Carbonate (native)	"	3	15 0
Sulphate (native levigated)	"	45/-	to 75/-
ig Powder, 35 %	"	5	7 6
Liquor, 7 %	"	2	10 0
de of Carbon	"	13	0 0
um Acetate (crystal	per lb.	0 0	6
Chloride	per ton	2	2 6
lay (at Runcorn) in bulk	"	17/6	to 35/-
Red Dyes:—			
ine (artificial) 20 %	per lb.	0 0	9
ita	"	0 0	3 9
Red Products			
acene, 30 % A, f.o.b. London	per unit per cwt.	0 1	5
l, 90 % nominal	per gallon	0 3	4
50/90	"	0 2	7 1/2
lic Acid (crystallised 35°)	per lb.	0 0	10 1/2
(crude 60°)	per gallon	0 2	8
ote (ordinary)	"	0 0	2 1/2
(filtered for Lucigen light)	"	0 0	3
Naphtha 30 % @ 120° C.	"	0 0	1 4
2 Oils, 22° Tw.	per ton	3	0 0
f.o.b. Liverpool or Garston	"	1	8 0
it Naphtha, 90 % at 160°	per gallon	0 1	9
en Oils (crude)	"	0 0	2 1/2
Chilli Bars)	per ton	48	7 6
ulphate	"	26	0 0
oxide (copper scales)	"	51	0 0
e (crude)	"	30	0 0
(distilled S.G. 1250°)	"	55	0 0
.. .. .	nett, per oz.	8 1/2	d. to 9d.
phate (copperas)	per ton	1	10 0
phide (antimony slag)	"	2	0 0
eet) for cash	"	14	0 0
harge Flake (ex ship)	"	15	10 0
etate (white	"	23	10 0
(brown	"	18	5 0
rbonate (white lead) pure	"	19	0 0
trate	"	22	0 0

Lime, Acetate (brown)	"	8	0 0
" (grey)	per ton	13	15 0
Magnesium (ribbon and wire)	per oz.	0 2	3
" Chloride (ex ship)	per ton	2	5 0
" Carbonate	per cwt.	1	17 6
" Hydrate	"	0	10 0
" Sulphate (Epsom Salts)	per ton	3	0 0
Manganese, Sulphate	"	18	0 0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
" Ore, 70 %	per ton	4	10 0
Methylated Spirit, 61° O.P.	per gallon	0 2	2
Naphtha (Wood), Solvent	"	0	3 10
" Miscible, 60° O.P.	"	0	4 6
Oils:—			
Cotton-seed	per ton	22	10 0
Linseed	"	24	10 0
Lubricating, Scotch, 890°—895°	"	7	5 0
Petroleum, Russian	per gallon	0 0	5 1/2
" American	"	0 0	5 1/2
Potassium (metal)	per oz.	0 3	10
" Bichromate	per lb.	0 0	4
" Carbonate, 90% (ex ship)	per ton	19	0 0
" Chlorate	per lb.	0 0	5
" Cyanide, 98%	"	0	2 0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10 0
" (Caustic Potash) 75/80 %	"	21	10 0
" (Caustic Potash) 70/75 %	"	20	15 0
" Nitrate (refined)	per cwt.	1	3 6
" Permanganate	"	4	2 6
" Prussiate Yellow	per lb.	0 0	9 1/2
" Sulphate, 90 %	per ton	9	10 0
" Muriate, 80 %	"	7	15 0
Silver (metal)	per oz.	0 3	7 1/2
" Nitrate	"	0 2	5 1/2
Sodium (metal)	per lb.	0 4	0
" Carb. (refined Soda-ash) 48 %	per ton	6	2 6
" (Caustic Soda-ash) 48 %	"	5	2 6
" (Carb. Soda-ash) 48 %	"	5	10 0
" (Carb. Soda-ash) 58 %	"	6	15 0
" (Soda Crystals)	"	2	17 6
" Acetate (ex-ship)	"	15	15 0
" Arseniate, 45 %	"	11	0 0
" Chlorate	per lb.	0 0	6 1/2
" Borate (Borax)	nett, per ton	29	10 0
" Bichromate	per lb.	0 0	3
" Hydrate (77 % Caustic Soda)	per ton	12	15 0
" (74 % Caustic Soda)	"	11	15 0
" (70 % Caustic Soda)	"	10	5 0
" (60 % Caustic Soda, white)	"	9	10 0
" (60 % Caustic Soda, cream)	"	9	0 0
" Bicarbonate	"	6	0 0
" Hyposulphite	"	5	10 0
" Manganate, 25%	"	9	0 0
" Nitrate (95 % ex-ship Liverpool)	per cwt.	0 8	0
" Nitrite, 98 %	per ton	27	10 0
" Phosphate	"	15	15 0
" Prussiate	per lb.	0 0	7 1/2
" Silicate (glass)	per ton	5	7 6
" (liquid, 100° Tw.)	"	3	17 6
" Stannate, 40 %	per cwt.	2	0 0
" Sulphate (Salt-cake)	per ton	1	7 6
" (Glauber's Salts)	"	1	10 0
" Sulphide	"	7	15 0
" Sulphite	"	5	5 0
Strontium Hydrate, 98 %	"	8	0 0
Sulphocyanide Ammonium, 95 %	per lb.	0 0	8
" Barium, 95 %	"	0 0	5 1/2
" Potassium	"	0 0	8
Sulphur (Flowers)	per ton	7	15 0
" (Roll Brimstone)	"	6	0 0
" Brimstone: Best Quality	"	4	5 0
Superphosphate of Lime (26 %)	"	2	10 0
Tallow	"	25	10 0
Tin (English Ingots)	"	94	0 0
" Crystals	per lb.	0 0	6 1/2
Zinc (Spelter)	per ton	20	15 0
" Chloride (solution, 96° Tw.	"	6	0 0

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

Advertisements.

Messrs. Kearne and Rawlinson's valuable Vitriol and manure Works at St. Helens Junction.

TO BE SOLD BY AUCTION BY MESSRS. J. B. & B. LEACH.
On Thursday, the 24th day of April, at Half-past Two for Three o'clock, at the Borough Salerooms, No. 21, Hardshaw-street, St. Helens, subject to conditions of sale to be then produced.

THE Freehold LAND, comprising 15 acres and 367 yards or thereabouts, situate in the township of Sutton, and particularly shown on the plan; together with the Vitriol PLANT thereon.

The Vitriol Plant is in full work, and is capable of producing 70 to 80 tons of 140 degrees Twaddle per week, with storage tanks to hold four to five weeks' production, with the necessary engines and boiler, acid egg, and Gay lussac, and Glover tower.

The Manure Plant comprises chimney stack 75 yards high, two large sheds or warehouses, engines and boiler, four pairs of burr stones with gearing and elevators, large sieving mill by Neill, wash tower, and necessary appliances for producing about 250 tons of superphosphates per week. The sheds or warehouses could well be adapted to many other purposes at a trifling cost.

There is about 1,000 yards of siding, with necessary points and crossings connected with the London and North-Western Railway.

Also two-storey offices, laboratory, good stabling, caretaker's house, and 16 workmen's cottages, in good repair.

The works are on the east side of the St. Helens and Garston branch of the London and North-Western Railway, and are about ten minutes' walk from three stations, Clock Face, Sutton Oak, and St. Helens Junction.

For further particulars apply to the auctioneers, Borough Chambers, 21, Hardshaw-street, St. Helens; or to Messrs. Payne and Frodsham, solicitors, 7, Harrington-street, Liverpool.

OPENING OF THE PERMANENT CHEMICAL EXHIBITION.

ON Tuesday evening last, the Permanent Chemical Exhibition was opened in presence of a large and representative gathering of gentlemen connected with the chemical and allied industries. The opening address was delivered by Mr. Ivan Levinstein, chairman of the Manchester Section of the Society of Chemical Industry, and chairman of the Chemical Committee of the Manchester Chamber of Commerce.

In a short opening address he said that when he was asked by his friend, Mr. George E. Davis, to open the handsome and well-arranged chemical exhibition which they had just had the pleasure of inspecting, he consented with very great pleasure, because he looked upon the establishment of the exhibition as another sign of the activity and increase of enterprise in the chemical trade of this neighbourhood, and he believed that such an exhibition must be useful in the development of our industries.

That chemical exhibitions could be made instructive as well as attractive was proved by the popularity of the chemical section of the Manchester Jubilee Exhibition, and it was not at all unlikely that its success first suggested the idea of perpetuating such an exhibition in this city. However true might be, he thought that the promoters deserved all credit for the manner in which they had carried out their scheme.

The object of the exhibition was not only the illustration by specimens and otherwise, of the results of chemical operations and kindred processes, but also the illustration of the appliances necessary for arriving at these results in the best and most economical manner. In addition to bringing together the various exhibits of chemicals and products of similar character and the necessary machinery for their production, the promoters had set aside in the building for the convenience of visitors writing-rooms, a smokers room, lavatory telephones, &c., with a view to facilitate the transaction of business and ultimately make use of this part of the building as a kind of chemical exchange—an idea which he hoped might be realised before long.

Other useful attractions, such as a very comprehensive technical library, including a number of periodicals and trade catalogues, ought to assist in making the exhibition building a favourite meeting place of many who were interested in the chemical trade. There was no doubt in his mind that such an exhibition, under good management, must be useful in many ways. Take, for example, the large number of appliances intended for saving labour in chemical works, and which was constantly being increased by the introduction of new and improved machinery and plant. Now even if it must be admitted that many of these appliances did not fulfil all that was claimed by the makers of them, on the other hand there were many which would be welcomed as introduced by manufacturers if they only knew their merit. The difficulty, however, was to differentiate their value, and this was not at all surprising, as those daily engaged in practical work could ill afford the time and money necessary to experiment and test all of them.

ing-felt want" could be successfully met, then, by a great exhibition, showing by drawings and, where at all possible, by working models, the advantages of the various appliances, the working of which could be explained by the attendants in the exhibition, or by reference to a manager.

It might be allowed, perhaps, to suggest that if space permitted there should be included in the exhibition smoke-preventing appliances, of which we had lately heard a great deal, and this mostly from people who knew very little of practical working. Many of those who were engaged in the chemical trade had tried smoke-preventing apparatus of one form or another, and almost as many, he dared say, killed them out again, either on account of their inefficiency or the greatly increased expenditure, and in the end that thus far their experience had taught them that it was the best and cheapest remedy was plenty of boiler and slow and regular steady firing. If, however, work-models could be seen which could prove to their satisfaction that any real advantage would result from their use, no doubt that they would be only too glad to adopt the most suitable and best appliances, notwithstanding their previous experience, which some of them might hitherto have

never had. Another advantage which he anticipated from the exhibition was the collection of specimens of various chemicals from recognised makers—not mere specimens specially got up for exhibition purposes. Such a collection might be found useful for reference in disputes, which sometimes arise in interpreting the words used in chemical contracts, and of a very good commercial quality."

He would like also to suggest that in addition to periodicals, and books of a technical nature, newspapers, &c., statistical and insular reports should be kept with reference to the prices of chemicals, &c., and that samples and specimens of chemicals and similar products intended for export, as well as English, should be exhibited, in order to show our merchants and manufacturers the different methods of doing things in this and other countries. That this was possible, he thought, would be admitted when it was remembered that it had often occurred that foreign goods, especially iron goods, had been preferred to ours, for no other reason than that their labels or general make-up was nicer in appearance, although the quality of the goods was in no way superior to the quality of ours.

Considering all the advantages offered by the promoters to the public, he heartily wished success to this new enterprise, and now declared the exhibition open. (Cheers.)

Following descriptions represent the bulk of the exhibits now in the exhibition, many others are now ready to come in.

The Blackman Ventilating Co.

A specimen of their well-known Air Propeller, which may be used for many purposes in connection with the chemical industries. Fixed against the wall, it shows the application of this appliance for ventilating and equalisation of air in factories. Mechanical appliances of this kind, up to within the last three or four years, have not found a market for these purposes; but the ease with which the Blackman propeller can be applied in nearly every case and in every place, has changed the condition of things as well as the atmosphere of our factories and workshops. In a woollen factory in the West of England a 48-inch Blackman Air Propeller was fixed for dry-rot on the existing tables, having about 500 square feet of wire mesh covered with it, and through this the Air Propeller draws or forces air at the rate of 20,000 cubic feet per minute. All this air comes from a very large adjoining room, so that this room is ventilated while the fan is doing work in another direction. Until the last few years machines for moving air were designed as a rule for forcing air against considerable resistance, as for blowing smiths' cupolas. For these purposes the form and capabilities of the Blackman fan are well suited, but for dealing with freer air in quantity nothing like the Blackman Air Propeller. The scoop shape of the fan, with its peripheral flange, has given this appliance several important advantages, and when we come to consider that an 84-inch fan, making 300 revolutions a minute, will move not less than

100,000 cubic feet of air in the same time, with an expenditure of six H.P., the advantages of such a machine need no further demonstration.

Messrs. G. G. Blackwell and Co.,

The mineral merchants, of Liverpool, show a very handsome case, which they had formerly on view at the Irish Exhibition in London. There are some fine specimens of manganese of various strengths, and the summit of the pile of specimens inside the case is topped with one of the finest samples of manganese ore we have ever seen. Amongst the others stand out cryolite, French chalk, or steatite, of which Mr. Blackwell makes a speciality, and which, besides being in powder and lump, is sawn into small blocks or pencils for the use of engineers and others, for marking upon iron. Barytes, both in the form of carbonate and sulphate, is another good show of Mr. Blackwell's, as well as bauxite, of which he is, perhaps, the largest provider in this country, for alum making, alum cake, aluminoferric, and many other purposes. The case also contains some specimens of sulphate of alumina, of great interest to the technologist, and especially is this so of that made by means of Newland's process, and which is of very good quality. There is also a specimen of Weldon mud, the artificial oxide of manganese, on which so much turned in the celebrated trial between Messrs. Spence and Kurtz, showing that to-day it is a merchantable article, and can be bought on application to the proper quarter. A sample of water, purified by the A.B.C. process of the Native Guano Company, finds also a space in Mr. Blackwell's collection.

Messrs. Bracher and Co., of Wincanton,

have two appliances in the Exhibition; one of their Patent Mixer, which, though small in size, is able to get through a large quantity of work, and is much used by the smaller chemical manufacturers for such purposes as mixing dry paints, powders, such as baking powder, and other operations, which, though very important, are often performed in a very slipshod manner, owing to the want of some such ready appliance as this.

Bracher's Automatic Still, in copper, is also an exhibit. An account of this still has already been given in the *Chemical Trade Journal*, and it may be again stated here that its peculiarity consists in its capability of doing the maximum quantity of work when the condensing water is kept nearly at the boiling point. There are many uses to which this still can be put, and we feel sure that no one would prefer to purchase distilled water when a small and continuously working still of this character can be obtained. Messrs. Bracher have several other appliances of extreme utility.

Messrs. Brunner, Mond and Co., Limited,

of Northwich, who are, we suppose, the largest makers of soda ash in the world, and that by the ammonia process, have an exhibit which has returned from the Melbourne Exhibition. The case has not suffered by its perambulations, which argues well for the care with which our common carriers perform their duties. In six large handsome glasses we find specimens of Messrs. Brunner Mond and Co.'s productions. There is the ordinary bi-carbonate of soda, which, on being calcined, furnishes their high strength soda ash of commerce, which is so well-known throughout the entire world. Then there is the purified bi-carbonate of soda, which we believe to be quite as good (at a less price) as some of the more highly prized qualities to be found in the market at much higher figures. We also find samples of sulphate of ammonia, muriate of ammonia, sesqui-carbonate of ammonia and soda crystals, which this firm now produce in the ordinary way of trade. These samples should be inspected by all paper makers, dyers, calico printers, and users of alkali products generally, for there is no doubt that the purchase of a high-class alkali such as this is, is far cheaper in the long-run than the use of such abominations as caustic bottoms and weak soda ash, which lead to all manner of difficulty when they are employed in industries where the presence of impurities is apt to do so much damage.

The Buckley Brick and Tile Co., Limited,

of Buckley, near Chester, have a stand showing a great many samples of their well-known firebrick ware. There is exhibited, for instance, a ring of well-made blocks which this firm supplies as a speciality for forming the arches in Glover and Gay Lussac towers. Anyone who values the permanence of his structure would do well to consult this

form of building. It is far more lasting and far more solid than any arch built with ordinary bricks. There are tiles such as are used in the Chance-Claus kiln; elevators employed in the wet copper extraction process, spreading roses for saltcake pots, stoneware packing for absorbing towers, and revolver breaker blocks. We do not suppose that this list is an exhaustive one. The Buckley Brick and Tile Co. are an enterprising firm, and if they see their way to business in any particular direction, they are ever ready to consult the desires of their customers, and produce anything in fireclay ware that is wanted.

Mr. W. F. Clay,

the chemical bookseller, of Edinburgh, has a fine collection of chemical literature. Mr. Clay is one of those men always on the look out for something new, and even the old does not escape his notice, so that anyone requiring chemical literature, whether it be old or new, is sure to find it in Mr. Clay's list. We have just taken up a catalogue from beneath this exhibit, and there we find many works on the chemical and allied industries—brewing, dyeing and calico printing, astronomy, botany, electricity, engineering, mechanics, geology and mineralogy, meteorology, metallurgy, natural history, medicine, and surgery. In looking over the list we find that Mr. Clay does not confine his attention to English literature, American and German works forming quite as important a section with him as British, so that visitors to this Exhibition, if they are in want of any technical information, cannot do better than consult Mr. Clay's catalogue and exhibit.

The Clayton Aniline Co.

of Clayton, near Manchester, have a splendid show case, which was formerly in the Paris Exhibition.

The articles exhibited by the Company are:—Crude naphtha, light oil, pure benzole, pure toluole, pure xylene, nitrobenzole, nitrotoluole, nitroxylene, nitrobenzole for explosives; binitrobenzole, binitro-toluole, essence of mirbane, aniline, toluidine, xylydine, orthotoluidine, paratoluidine, aniline salt, metaxylidine, orthonitrotoluole, paranitro-toluole, azobenzole, azotoluole, benzidine, toluidine sulphate, carnotine sulphate, and antifebrine. Rouge drap Clayton, Clayton yellow, aurotine, Stanley red for silk, muriatic acid, nitric acid, sulphuric acid recovered from waste acid, &c., &c. The above colours, except carnotine, being patented by the Company.

The Company was formed in May, 1876; the works had to be built, and they began to manufacture in March, 1877. At first the works were fitted up for a production of only 250/300 tons of aniline per annum. They produced their own nitric acid, but no sulphuric acid, nor the pure muriatic acid required for the manufacture of aniline salt, and they bought their benzole.

Since then the Company, under the management of Dr. Dreyfus, has increased their power of production considerably. They hold the position of being the largest producers of aniline in this country.

The Company manufacture their own nitric acid, and the cylinder acid (pure hydrochloric acid), required for the manufacture of aniline salt; they make besides very large quantities of pure benzole, pure toluole, pure xylene from crude naphtha and light oil, which is used for their own manufacture. The quantities of crude naphtha, light oil, and benzole worked by the Company are very great.

A great improvement has been made in these works in the recovery of nitric acid, nitrobenzole, and sulphuric acid from the so-called waste acid from the nitrobenzole, nitrotoluole, and binitro manufacture.

In nitrifying benzole or toluole, a mixture of nitric acid and sulphuric acid at 168° is employed, the proportion being—

About 300 lbs. mixed acids for 100 lbs. pure benzole.

„ 260 „ „ toluole.

This gives nitrobenzole, and a weaker acid having a specific gravity of about 1.640 = 128°, which is called waste acid. As every 100 lbs. benzole nitrified, give about 230 lbs of this waste acid, and as the Company nitrify, on an average, 9,000 lbs. pure benzole per day, the quantity of waste acid produced is about 20,700 lbs. per day.

This large quantity of waste acid is too weak to be used as such for the production of nitric acid, and was, and is still, a very great burden to aniline manufacturers. This company are the first aniline manufacturers, who, not having a vitriol works at their disposal, have succeeded in

making from this waste acid the ordinary rectified vitriol, such rectified vitriol being in every respect as good as the ordinary rectified vitriol direct from the vitriol works, and the Company are using such rectified vitriol for nitrifying and other purposes.

This method and apparatus for the recovery of the waste acid has been communicated to a friendly firm in France, Messrs. Duran, Huguenin and Cie., of St. Fons, near Lyons, who have also exhibited at Paris, and who will bear out the statement as to the advantage of such recovery for aniline works. Another improvement made in the recovery of useful products from waste acid is the following:—The waste acid contains always about 10% of nitric acid and $\frac{3}{4}$ % nitrobenzole or nitrotoluole. Dr. Dreyfus has succeeded, at a small cost only, in extracting these valuable substances from the waste acid and he believes he is the only aniline manufacturer doing this. He also utilizes the waste from the manufacture of binitrobenzole and binitro-toluole, as well as the nitric acid and binitrobenzole and toluole that is left in such waste acid. The quality of the article manufactured by the Company bears a high reputation for its purity. The pure benzole, pure toluole, and pure xylene, are of the highest standard of purity for commercial products, as are the nitro product and the binitro products therefrom. The pure aniline has an average specific gravity at 15° Centigrade of 1.0270, and boils within 1 degree. The ordinary toluidine contains over 35% of para toluidine the para toluidine contains under 1% of ortho, and the ortho toluidine under 0.5 para. The aniline salt is as nearly chemically pure as possible.

The binitrobenzole has a solidifying point of 83°.

„ toluole „ „ 65°, and they are both free from acid and moisture.

The other articles are at present used for the colour works of the Company. These works were begun in 1888, with the manufacture of carnotine, a colour in every respect the same as primuline. Since then the production has been extended by the manufacture of aurotine, a colour patented by the Company, and which dyes wool a fine yellow, standing fulling, not bleeding, and very fast to light and air also Clayton cloth red, another colour patented by the Company, which dyes wool in fast shades, standing the action of air and light, fulling and not bleeding. This latter colour has the remarkable property of dyeing a red on silk, which does not bleed; it can be used also for producing pinks and reds on calico by printing. These colours have been protected by letters patent.

Clayton yellow is another patented colour of the Company, which dyes cotton without a mordant, and is useful for printing; it dyes silk also.

As distillers of naphtha, the Company supply solvent naphtha to india-rubber manufacturers, and Dr. Dreyfus has recently taken out letters patent in France and England and elsewhere for the production of a purified solvent naphtha, with which india-rubber goods, free from the well-known obnoxious smell, can be produced.

Mr. J. Cortin, of Newcastle-on-Tyne,

has a very fine exhibit of non-rotative acid valves, which have been devised to fulfil a want long felt by chemical manufacturers and others of a safe, durable, and efficient means for stopping or regulating the flow of acids or other corrosive fluids. The ordinary cocks and other means hitherto employed have many drawbacks, such as plugs lifting and flying out, scalding attendants, causing accidents, leakage, and the great wear and tear by friction of these soft metals cause them to become useless. The body and valve of these appliances are made of a special mixture of regulus, and withstand the action of acids and other corrosive fluids for a very much longer period than any other metal. The peculiarity lies in the plug being non-rotative, rising and falling into its seat out of a mitred setting without turning round, and is therefore free from friction in working, and the wear and tear thus reduced to the smallest possible amount. Most chemical factories of any repute use these valves, and we are sure the exhibit will be looked at by all visitors with great interest. Mr. Cortin also shows his combination of stone and antimony cocks, and his all-antimony bib-cocks. He also exhibits his steam tap for the regulation of steam into vitriol chambers, which is graduated so that the attendant may be able to know whether the steam has been altered or not in his

There is also the usual hydrogen apparatus for the auto-oxidizing of lead, with bellows, jets, and nozzles. Altogether, it is a very interesting one, especially from a chemical engineering point of view.

Messrs. Davis Bros.,

Chemists and chemical engineers, have exhibited some of the products from processes in which they are interested. The process of distilling coal for the sake of the products, as now carried on by sole licensees, Messrs. Newton, Chambers, and Co., near Manchester, is illustrated by samples of pure benzene and pure toluene in the operation, as well as samples of 90 per cent. benzol and naphtha. The process is also applicable to the gases from the distillation of tars, and samples are also shown of solvent naphtha, burning, and kerosene oils, obtained from that source. These identical samples were first exhibited at the Inventions Exhibition in London, and are now in as good a condition as when sent from the first instance.

The proprietors also show a series of products obtained from the treatment of phosphate of alumina with sand, salt cake, and coal. By this mixture an insoluble double silicate of alumina and soda is obtained, together with tribasic phosphate of soda, known in commerce as "Tripsa." The exhibit contains samples of the phosphate deposits from Alta Vela and from the islands of Redonda and Roques.

"Tripsa" has been employed as a preventive of boiler incrustation, and for the purification of waste waters from mills and factories. The comparative high price has hindered its becoming generally known. The application of "Tripsa" to the purification of sewage, waste waters from mills and factories, is shown by a series of slides and in connection therewith, is another series of the dried sludge obtained in the process.

The orion evaporator, as applied to the recovery of soda from paper mill liquor, and to the recovery of potash from wool-liquor also is shown by an interesting collection of samples.

Messrs. Galloways, Limited,

At the exhibition two large photographs, one of their boiler shed, the largest in the world, being 420 feet long, and 180 feet wide. The other is a photograph of three of their large steel boilers, 100 ft. long and 8 feet in diameter, which are now driving 1,500 H.P. The photographs themselves are very good specimens of the photography of the present day, and give the observer a very good idea of the extent of the engineering industry of the present day.

Messrs. Grimshaw Bros., Limited,

At Manchester, exhibit a very good collection of the various chemical products used, not only in the india-rubber trade, but in the industry of sizing and weaving. We find here, specimens of rubber and india-rubber solution, starch and sizing materials; sizing tallow, sizing grease, French chalk, all of which are special bearings upon the textile industries. But the point running through Messrs. Grimshaw's exhibit, is the application of the use of many zinc compounds. Chloride of zinc, carbonate of zinc, sulphate of zinc, zinc in zinc ferro-cyanide, zinc phosphate, zinc silicate, and other compounds of zinc, are here exhibited. All these compounds are in connection with some industry or another, and Messrs. Grimshaw have for many years made a speciality of this kind of work.

Messrs. Jewsbury and Brown,

At Manchester, show an excellent collection of aerated waters. This has become of immense importance during the past few years. A very large demand has sprung up for non-intoxicating soda water. It is to provide for this that such firms as Messrs. Jewsbury and Brown have built up their businesses, and in the case shown in the exhibition, may be seen the ingenuity of many brains for the requirements of the public. Potash and soda waters are presented, as well as Seltzer, Vichy, Carrara, and lime water, and have a goodly collection of compound beverages, such as stout, beer, champagne, cider, ginger beer, &c., &c. It may be said that this is hardly a chemical industry, but if it will only reflect, they will understand that it is essentially a

chemical industry. Carbonic acid is required and manufactured. This is forced through water under strong pressure. The various flavourings and ingredients forming the various beverages have to be manufactured, so that if this is not a chemical industry, it at least fosters and encourages a great many branches of it.

Messrs. C. B. Lindsey and Co.,

At Clayton, near Manchester, are makers and manufacturers of pyro-ligneous products, as well as a variety of other chemicals. The case they have in the Exhibition contains a large sample of commercial grey sugar of lead, the crude material before refining, while the bottom shelf of their case contains a good assortment of sulphate of copper crystals. Commercial nitric acid and nitrate of lead may also be found exhibited, and there is a large sample of peroxide of lead. All these products are used in the industries of which Manchester is the centre, and the excellent quality of the products made by Messrs. Lindsey has obtained for them a good reputation.

Messrs. Charles Lowe and Co.,

At Reddish, near Stockport, have no exhibit of their products, but they have placed a large mural tablet on the Exhibition walls to inform visitors that they are makers of carbolic crystals, melting at 40°, at 35°, and also at 29°, and that they are makers of cresylic acid, of picric acid, and aurine, of phenates and cresylates, and of the various metallic salts of sulphophenic acid. They are also makers of sheep dips and disinfecting powders. Perhaps Messrs. Chas. Lowe and Co. are of opinion that "good wine needs no bush," and therefore it is unnecessary to exhibit the actual substances produced in their extensive works at Reddish, but it would be much more interesting to intending purchasers to see the actual substances they are likely to require.

The Manchester Aniline Co.

At Manchester, have sent the case they had on view at the Manchester Exhibition, but the exhibits have been re-arranged, and the patterns, etc., dyed with the latest colours. Upon a shelf at the back of the stand may be seen a series of products from crude benzol right up to aniline, which is the base of most of the colours exhibited. There are also to be found dyed patterns of cotton yarns, raw cotton and prints, to illustrate the uses and applications of aniline black, and these are blended with a few fancy colours on jute, cotton yarns, satteens, prints, etc. There is also a very good collection of miscellaneous chemical products, such as acetate of chrome, and phthalic acid, in some of the best crystals it is possible to conceive. A collection of materials for softening and finishing cotton goods concludes the list which this firm have placed for visitors to see.

Messrs. Meldrum Bros.,

At Cathedral-yard, Manchester, have collected round one of the central pillars of the establishment a very complete show of their well-known steam ejectors, exhausters, silent boiling jets, and air compressors, so that visitors may be familiar with the style of work this firm is capable of turning out. There is to be found a large steam blower capable of delivering 50,000 cubic feet of air per hour, under a 2 in. or 3 in. water pressure; a boiling jet or silent heater, to boil 800 gallons of water per hour; a gas producer blower with inlet air valve, to gasify up to 5 cwt. of coal per hour against a counter-pressure of 12 in. or upwards; an air compressor for 35,000 cubic feet per hour, to a pressure of 5 lbs. per square inch and upwards; an ejector or exhaustor for 15,000 cubic feet per hour, which, with a 50 lb. steam pressure, will give a vacuum of 26 in. of mercury; and a 1 in. acid elevator with five loose flanges for lifting 400 gallons of acid per hour. It may be well known to most of our readers that Messrs. Meldrum Bros. have fitted up a large number of under-grate blowers in connection with their patent for burning breeze, ashes, and refuse coal. Some day Messrs. Meldrum may possibly see their way to fit up one of these appliances in this Exhibition, anyhow, the matter deserves special attention on the part of coal consumers, who have to face the difficulty of a higher coal bill than they have had before for many years. A drawing of this patent may be seen in the Exhibition.

Messrs. E. D. Milnes and Brother,

At Bury, exhibit a very fine case of dyewoods and dyewood extracts. The show they have made has produced a good effect, and was much appreciated. In the centre of the case is a

large and well-executed photograph of their Bury Works, around which is draped goods which have been dyed with their extracts. It is a very interesting sight, in this Exhibition, to be able to compare the old colours produced from natural products with the newer ones produced artificially from perfectly non-coloured raw materials, and perhaps if Messrs. Milnes could carry us back to the days when even extracts were unknown, the raw woods and materials being employed, we should see that a great advance in tinctorial power has resulted from the application of science to this industry.

The case contains specimens of almost all the natural products employed in the tinctorial arts, logwood, barwood, fustic, myrabolams, turmeric, va'onia, sanders wood, camwood, Brazil wood, sapan wood, larch bark, sumac, Persian berries, quercitron, quebracho, madder roots, lima wood, cutch, galls, divi divi, and cube gambier. Nicely polished pieces of the various woods accompany the glasses containing the specimens ready prepared for the dyer.

The Newcastle Chemical Works Co., Limited,

of Newcastle-on-Tyne, exhibit some of their well-known products, solid caustic soda of 77% strength, both solid and ground, and some of the Chance recovered sulphur, which is now being so largely produced by several of Mr. Chance's licensees. This exhibit is a parallel to that of Messrs. Brunner, Mond, & Co.; the latter deal exclusively with high strength carbonate of soda, the former deal almost exclusively with high strength caustic soda, and it is, no doubt, being perceived by all users of these products that the high strength is the cheaper in the long run. We know of many firms, who at one time, were perfectly satisfied with the results obtained by the use of 48% soda ash, and 60% caustic soda, that have now taken to use these high strength products almost exclusively, and the results obtained have been so much superior to the old *regime* that it is not likely to be departed from. The Newcastle Chemical Works Company have certainly produced an article in the shape of ground caustic, which is destined to come much more into use than even it is at present. The form itself is so handy compared with the old-fashioned way of breaking up a drum of solid caustic, that anyone who has used the ground article will at once appreciate its advantages.

Mr. Alfred Smith,

of Clayton, near Manchester, has on view a number of the products of which he makes a speciality, shellac and bleached lac, india-rubber substitute and india-rubber solution; chemicals employed in the rubber trade, such as hyposulphite of lead (black hypo), zinc oxide, iron oxide, light surface-black, sulphide of antimony, vermilion, and sublimed sulphur. There are also specimens of chloride of sulphur, bisulphide of carbon, solvent naphtha, and liquid ammonia. Mr. Alfred Smith is also the maker of the "Excelsior" disinfecting fluid which is exhibited in his case.

Messrs. Robinson, Cooks, and Co.

of the Atlas Foundry, St. Helens, exhibit two large drawings of their gas compressor and vacuum pump, fitted with Pilkington and Forrest's patent valves. These valves are so much superior to the old make of valves, that all who employ mechanical compressors should see these drawings. Messrs. Robinson, Cooks, and Co., have promised to add further details of this form of construction.

The Worthington Pumping Engine Co.

have on view one of their well-known "Duplex" pumps. It may be unknown to our readers that the Worthington pump was introduced into this country in 1885 after having been, for many years, in successful operation in the United States of America. There are now about 60,000 of these pumps at work, and at present they are being produced at the rate of 600 per month. Wherever they have been exhibited, either at work or at rest, they have secured the highest awards, and at the recent Paris Exposition they obtained the only "Grand prix" awarded to pumping machinery.

The pump is designed so as to obtain a positive steam valve motion without the aid of tappets, crankshaft, fly-wheel, connecting or eccentric rods. This is effected by arranging two steam pumps alongside each other, and causing the piston rod of the one to actuate the valve rod of the other by means of a swing lever and rocking-shaft. At the end of the stroke each pump rests till its steam valve is opened by the travel of its neighbour, and thus all slamming of water valves,

and loss through "slip" are avoided. Before one pump rests, the other has commenced to travel, and thus a constant uniform discharge of water is maintained.

This feature of the pump is of the greatest value in transport volumes of liquor to great distances, as in transport of by pipe lines, or as in the proposed transport of salt brine from Cheshire saltfields to the place of manufacture; and has exclusive adoption in the National Transit Company's petrol lines in America, after other pumps had been tried and found pumps are self-contained, and require little foundation, and work done occupy very little space.

They are now in extensive use in all industries in this country for water supply, boiler-feed, liquor transmission, hydraulic press pumps, and, in short, for every purpose for which pumps can be used. One guarantee of the success of the pump is the number of which have been put into the market.

Messrs. Musgrave and Co.,

the well-known heating engineers of Belfast, have heated their works with several of their slow combustion stoves. The exhibit is a large one, and the stove fixed close to the entrance has a capacity of more than heating the place very uniformly. In another room a much smaller stove is fixed, and the experience attended the lecture was that this size of stove is capable of heating a room of twice the cubic capacity. The laboratories connected with the establishment are also heated with these slow combustion stoves. It is a great pity that the excellence of these heating arrangements is more widely known. Coke is the fuel employed, the absolutely smokeless, and their economy in the matter of fuel is marvellous.

Mr. J. Royle

has exhibited one of his steam-reducing valves, which Messrs. Benson, Pease and Company use in connection with the engines they have on exhibition. The general experience of steam engines is that reducing valves are too delicate to be relied upon, but Mr. Royle's valve is a notable exception to this general rule, as it is reliable, and may be used with very great advantage where the pressure of steam is desired, such as, for instance, in the vitriol chambers, and stills of all descriptions.

The Chadderton Ironworks Company

have on view one of their patent steam dryers of large size, of which they have placed one of the Chadderton steam trap (McDougall's Patent). The exhibit itself shows at once how to fix either of these appliances to ordinary steam mains, and one and all were much struck with the simplicity of the arrangement. There is no doubt the McDougall steam trap is one of the best—the best—steam trap in the market, and those who have given up other kinds as being unreliable will no doubt be pleased with the introduction of this one.

Messrs. R. and J. Dempster,

the engineers, of Manchester, have placed a large series of photographs, showing many forms of work they execute, such as annular condensers, telescopic gas holders, gas purifiers, exhausters, the Livesey patent washers and scrubbers; a very comprehensive picture of what they are able to execute at Newton Heath.

Messrs. Joseph Wright and Company,

of Tipton, have placed two photographs illustrating the application of the Berryman feed-water heater, and they have also reserved for the exhibition of one of these appliances. There is doubtless the high price of fuel now prevailing will be an incentive to many things tending to the economy of fuel, and much of that which is being allowed to escape into the open air will in the future be utilised by appliances of this kind.

Messrs. Doulton and Co., Lambeth.

To praise the wares turned out by this celebrated firm would be superfluous, but we cannot refrain from remarking the admiration that was expressed at the beautifully finished stoneware chemical stone ware exhibited. The collection consists of mixing and boiling pots, stills with still-heads and condenser receivers, taps, perforated tiles, and store jars for acid

this last class recently delivered deserves a special word of mention. It was of 600 gals. capacity, and a special kiln had to be constructed for firing it. In reference to the tiny taps displayed in the case we heard many visitors speculating as to the possibility of obtaining these for laboratory purposes—and it might be worth the while of the exhibitors to make a special push in this direction.

Messrs. R. Daglish and Co., St. Helens,

are represented in shadow rather than in substance, their exhibit consisting of two handsomely mounted collections of photographs, shewing typical machinery of their construction—blowing engines, a sludge pump, Brock and Minton's revolving filter press, etc. Perhaps the most striking feature of the collection is the photograph of an improved revolving black ash furnace, 30' 6" long with a diameter of 12' 6".

Mr. Joseph Aird, Greatbridge,

has made a very successful attempt to bring his speciality prominently before the eyes of visitors. The highly coloured tablet, four feet square, occupying a central position at one end of the exhibition, will allow no one to go away in a state of ignorance as to where iron tubing is to be obtained, or at least no one can attribute such ignorance to the fault of the enterprising manufacturer.

Messrs. Ashmore, Benson, Pease, and Co., Stockton,

are represented by three interesting exhibits. The patent ammonia still, of which they make a speciality, is illustrated by a large-sized model, completely fitted up, and capable of turning out a ton of sulphate of ammonia per week. These stills are either working or in course of erection in many places throughout the country—from Sanderland to Hastings—and the manufacturers have no less than four now in hand for immediate delivery. No better testimony to their efficiency can be desired than the fact that one well-known sulphate maker is at the present moment adding a fifth to his installation of four.

No less interesting is the small working model of their approved gasholder, constructed on what is now known as the wire-rope principle. The vertical guiding columns are superseded by a system of wire ropes, so arranged as to effectually distribute all lateral pressure, and obviate the necessity for outside support. Two accompanying photographs show a triple lift holder, fitted with the wire rope arrangement at Rochdale-road, Manchester. Another holder, on the same principle, is in successful operation at Haslingden, and a third is in course of erection at Newburn, near Newcastle.

This firm is also exhibiting one of Green's canvas screens—an arrangement in which canvas sheets are substituted for boards for gas scrubbing purposes. The main advantage consists in the possibility of obtaining twice the scrubbing surface in the same space.

Mr. Ernst Fahrig, St. Helen's Ozone Works, Plaistow.

We have here one of the most novel features of the Exhibition—a collection of samples of ozonised products. It must require a most courageous spirit to attempt to give practical life and being to a body so little known as ozone, but we think we can congratulate Mr. Fahrig upon the possession of this most essential quality. Samples I. and II. show esparto pulp bleached by ozone. Where this agent is employed there is said to be absolutely no "going back;" in fact, an imperfectly bleached material will become whiter by standing, as though some residual ozone were slowly spending itself, and thereby gradually bleaching the fibres. No. III. is ozonised water, suitable for killing microbes, and for sterilising purposes generally. No. IV. is a phial of ozonised oil. This is available either for medical or manufacturing purposes. In the latter case it may be utilised in the preparation of floorcloth, linoleum, &c., such as is shown in Sample VII. No. V. shows what is called "ozone ammoniated lime," the peculiarity being that a considerable quantity of nitrogen is said to be fixed in combination with the lime. No. VI. is "ozone oxidised mangan," a high oxide of manganese, formed by the action of ozone on a lower oxide. No. VIII. shows a bleached solution of sugar. Before treatment with ozone this liquor was jet black. The bleaching may be performed either before or after boiling. It is also applicable to dry sugar of all

The following paper was read by Mr. George E. Davis, at the conclusion of the chairman's inaugural address:—

NITRIC ACID CHLORINE PROCESSES.

"FAMILIARITY breeds contempt;" and perhaps it is because the mixture of nitric acid and hydrochloric acid has been so long known in the laboratory under the name of *aqua regia*, that it has been neglected as a means for the industrial preparation of chlorine. It is strange how one's mind becomes connected with practical processes a preference to the demonstrations of the laboratory. When speaking of the preparation of chlorine, one's thoughts hark back to the manganese still charged with liquid hydrochloric acid in preference to the *aqua regia* of the laboratory, and this has been the main process followed by the bulk of manufacturers ever since chlorine products were made merchantable.

But I would not have you think that no one has ever proposed, or even patented, processes for converting hydrochloric acid into chlorine by the aid of nitric acid, as quite the contrary is the case. No doubt ideas, resulting from observations of the action of *aqua regia* in the laboratory, were made the subject matter for several patents, but the fact that there is at the present time not one single factory in which a nitric acid chlorine process is at work speaks volumes in demonstrating that the reactions which take place have been insufficiently studied, and that none of the processes that have been patented up to the present day have been sufficiently worked out by the so-called inventors to produce a more economical process than the manganese process, and I have not seen yet a single specification in this direction which gives sufficient instructions to enable even an expert in such matters to lay down plant successfully for the production of chlorine from nitric acid.

But I must not forget to tell you that one process—viz., that of Denlo, to which I shall again shortly refer—was worked on an industrial scale, and for a considerable period, at the St. Rollox works of Messrs. Chas. Tennant and Co., but the strongest proof that it was not an industrial success is the fact that, although it had no competitors, it has died a natural death. When bleaching powder was high in price it lived; with low-priced bleach and cheap manganese recovery it could not hold its own. What more convincing proof is required of the truth of the doctrine of "the survival of the fittest?"

At least two other nitric acid chlorine processes have been exploited on a fair working scale. Only a few years ago Taylor's process (to be mentioned again later on) was experimented with at the St. Rollox works, and a small plant was afterwards erected at Bristol by the Gloucester Chemical Company to demonstrate the success or otherwise of the process. Another process patented by Donald (to which I shall also refer again) has been experimentally tried at a works in Widnes, so that I hope you will agree with me that the nitric acid processes have more than passing interest, and will warrant my entering into the subject of their history.

I would also desire to point out to you several of the advantages that would accrue from the employment of nitric acid in lieu of manganese in the chlorine manufacture. A nitric acid process comes as near the ideal of perfection as may be; firstly, there is no waste product whatever; secondly, with the exception of the salt employed in liberating the hydrochloric acid, all the raw materials are in a fluid state, and easy of transport from vessel to vessel; thirdly, the whole of the chlorine of the salt is obtained as free chlorine; fourthly, with properly constructed apparatus there are no sources of loss, as the only products drawn away from the process are salt-cake at the one end, and chlorine at the other.

Let us now refer to the history of such processes, as set forth in the inventor's own descriptions:—

In the year 1838 Messrs. Watt and Tebbutt (No. 7,531) obtained letters patent for "Improvements in the manufacture of oxides of lead, and also of carbonate of lead." In their specification they say that chloride of lead is to be treated with nitric acid, when chlorine passes off, and is passed into an apparatus such as is used in making chlorides of lime, soda, &c. This is, I believe, the first patent in which the use of nitric acid is prescribed for the production of chlorine. A few days after this (January 11., 1838, No. 7,538) these same gentlemen filed another specification, in which they say that chloride of sodium is put into a firebrick oven and a certain quantity of nitric or nitrous acid added, gentle heat is applied and the chlorine liberated passed into apparatus commonly used in forming the chlorides.

It is quite certain that neither of these processes could meet the requirements of the chlorine manufacture of the present day.

Nine years afterwards (March 16, 1847, No. 11,624), the well-known Dunlop process was patented. Dunlop describes his invention as follows:—"My invention consists of an improved method of producing chlorine fit for manufacturing purposes, by effecting mutual decompositions between the following substances:—Muriate of soda, or any other muriate, nitrate of soda, or any other nitrate, muriatic acid, nitric acid. The assistance of sulphuric acid is in some cases required. I generally prefer employing it, in order to obtain for residuum, sulphate of soda, suitable for the manufacture of soda, &c. The above substances may be employed either altogether, or only two of them; as, for instance, nitrate with a muriate (in which case, of course, sulphuric acid must be employed), or a muriate with nitric acid, or a nitrate with muriatic acid, or muriatic and nitric acids may be used together. For the latter cases sulphuric acid is employed, according to the results wished to be obtained. On the application of heat, chlorine, an oxide of azote, and muriatic acid are evolved. These gases are then passed through a suitable condenser charged with sulphuric acid of a strength sufficient to absorb the oxide of azote. The chlorine and muriatic acid are then separated by means of water." In dealing with the foregoing nitro-sulphuric acid Dunlop says, "The process I usually follow is to introduce the nitrous sulphuric acid into a suitable vessel when, by the addition of water and heat, the oxide of azote is disengaged. This latter is caused to traverse a suitable condenser along with a sufficient quantity of air and steam, or water, and is by this means all transformed into nitric acid, which can be used again in the manufacture of chlorine, and again recovered in the manner described, and so on."

In the next year, 1848, McDougall and Rawson (No. 12,333, Nov. 21st) filed an omnibus specification in which the collection and oxidation of nitrous fumes from any source is described. They pass the lower oxides of nitrogen alternatively into water, or an aqueous solution of nitric acid, with air containing oxygen, and this patent was actually granted in face of the one granted the year before to Dunlop.

Swindells and Nicholson, in 1852 (No. 390), patented a process for the production of chlorine, by adding nitric acid to hydrochloric acid, and heating the same so as to produce chlorine and nitrochloric acid, and this being brought into contact with oxygen gas, with the vapour of water, nitric acid is produced, and the chlorine conveyed where required.

Higgin, in 1854 (No. 766), in describing his invention for a mode of separating metals from each other states that one of the fluids he prefers to employ is a mixture of muriatic acid and nitrate of soda, which yields chlorine in solution; but it is not even hinted at as being a process for the industrial manufacture of chlorine gas. Gatty, in 1857 (No. 2,230), proposed to employ nitrates in the manufacture of chlorine, but only as an oxidiser for the manganese, but he patented the application of the nitrous fumes for use in the manufacture of sulphuric acid, either "at once," or after they had passed through condensers.

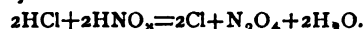
In the year 1858, Messrs. Roberts and Dale patented a process (No. 2,242) identical with that previously protected in 1847 by Dunlop. To be more correct, perhaps I may say identical up to a point. Messrs. Roberts and Dale pursued absolutely the same methods as Dunlop for the production of their chlorine; but when the nitrogen oxides were driven off from the nitrosulphuric acid, instead of oxidising them for employment again, Messrs. Roberts and Dale conducted them into a solution of alkali.

We may now pass to the year 1864 and turn to Specification No. 2,313, which is that of Messrs. Baggs and Simpson. This specification only received provisional protection—whether it was discovered that it ran on lines so similar to that of Dunlop as to be a very doubtful possession, I know not, but it is a noteworthy fact that it was abandoned. There is, however, one point of interest that concerns us now. It is that the inventors, operating upon nitric acid with hydrochloric acid, in a separate vessel, think it necessary to specify that a gentle heat should be applied. Chloronitric and chloronitrous gas with free chlorine are given off. Although Messrs. Baggs and Simpson abandoned the foregoing specification, yet it is doubtful whether it left their minds altogether, as Isham Baggs in 1866 (No. 3,296), obtained letters patent for improvements in the manufacture and treatment of hydrochloric and nitric acids, which seem to me to bear somewhat upon the processes at which they had previously been working. These improvements were the treatment of liquid nitric or muriatic acid with sulphuric acid in order to secure the absorption of the water by the latter.

Up to this time we seem to have no method differing essentially from the 1847 process of Dunlop; it is true that Baggs and Simpson preferred to bring the hydrochloric acid in contact with the nitric acid in a separate vessel, while Dunlop, as also did Roberts and Dale, preferred to mix the nitrate with the salt, and to decompose both with sulphuric acid, but in all three specifications there is a total absence of the why and wherefore of the various processes, and the claims are so wide that had the processes been successful, they might have been intended to include anything. They are just the kind of specifications it should

be the aim of the legislature to reject, as such patents are not only of no use to their possessors, but they stand in the way of industrial improvement to a much greater extent than is generally imagined.

We may now pass over a period of twenty years, rather a long time in chemical history, but a period in which the chlorine maker's attention was almost entirely rivetted upon the problem of manganese recovery from the older chlorine process. On the 1st of October, 1884, John Taylor applied for provisional protection for a new process for the preparation of chlorine gas, and on the 12th day of June, 1885, he filed his complete specification, from which I gather what he intended to be his *modus operandi*. This specification is an improvement on all that have gone before. It certainly bears a nearer resemblance to that of Baggs and Simpson than to that of Dunlop, but, in my opinion, it is not identical with either. I have before you a model of the Taylor plant, constructed from my own ideas gathered from his specification. Taylor says:—"In carrying out my invention gaseous-hydrochloric acid, obtained directly from the salt-cake furnace, or in any other convenient way, is passed through a tower or tube, or other suitable apparatus containing fragments of pumice stone, coke, or other suitable inert material, through which cold strong nitric acid is allowed to flow. The action of the nitric acid causes the formation of chlorine, nitrosyl chloride, water, and small quantities of nitrogen tri- and tetroxides, about two-thirds of the chlorine of the hydrochloric acid being set free at once. Taylor does not give us the details of the reaction, probably owing to the complications introduced by the presence of air, which always exists in very large quantity in furnace gases; but the main reaction is probably as follows:—

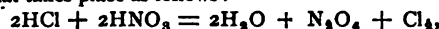


But besides this, varying amounts of nitrosyl chloride are formed by subsequent combinations that take place between the free chlorine and nitrogen oxides. The water formed during the reaction, and also that, I presume, coming from the vitriol used for decomposing the salt, is stated to be periodically removed from the bottom of the nitric acid tower. Taylor then states that the mixed gases, chlorine, nitrosyl chloride, and nitrogen tri- and tetroxides are passed into strong sulphuric acid, which absorbs the nitrous fumes, permits the chlorine to pass on unchanged, and decomposes nitrosyl chloride with the formation of hydrochloric acid and nitrosyl sulphate.

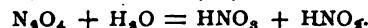
The resulting gaseous mixture of chlorine with a certain proportion hydrochloric acid is submitted a second time to nitric acid, and afterwards to sulphuric acid. The resulting gases are put through the processes a third time if necessary. The two alternations will produce a chlorine containing 90 per cent. of the hydrochloric acid as free chlorine, while three alternations produce about 96 per cent. In actual practice this chlorine is further washed with water to dissolve out the last traces of HCl.

In order to regenerate the nitric acid employed, Taylor places the nitro-sulphuric acid in a suitable vessel, and dilutes it by the gradual addition of water, while a rapid current of air is passed through. The nitrous vapours evolved are passed through water in a series of Woolf's bottles, whereby nitric acid of sufficient strength for use over again is obtained.

Let us now leave this picture and experiment and carry ourselves to the year 1887. In this year William Donald obtained letters patent for an invention "to obtain chlorine from hydrochloric acid, and to recover the bye-products formed during the operation." Hydrochloric acid gas is first dried by passing it through a suitable receptacle charged with sulphuric acid. The dried gas is then passed into a vessel charged with a mixture of strong nitric and sulphuric acids, where the hydrochloric acid gas undergoes decomposition. Donald represents the reaction that takes place as follows:—



and states that the vessel containing the nitric and sulphuric acids should be kept at a temperature about 0°C., while that of the gases ought not to exceed 30°C. The gaseous mixture resulting from the foregoing operation is now passed into a vessel containing cold dilute nitric acid, whereby nearly the whole of the oxides of nitrogen become fixed or absorbed, the reaction being expressed as follows:—



The chlorine, still containing small quantities of nitrogen compound, is now passed into a second absorbing vessel containing cold nitric acid, and finally through a scrubber containing sulphuric acid. This completes the elimination of the nitrogen compounds, and leaves the chlorine to pass on for use.

The nitric acid is regenerated by warming the nitrous liquors from the absorbers, and blowing a steady current of air through.

At a suitable temperature the nitrous acid very readily absorbs oxygen and becomes converted into nitric acid. The current of air requires very careful regulation, the object being, of course, to obtain a maximum of oxidation with a minimum of lower nitrogen compounds carried forward. Under any circumstances, some nitrous fumes will escape from the warmed liquor, but their hydration and oxidation will

be effected as they pass (together with the excess of air that must always be employed) in contact with the moistened surfaces exposed in the scrubber above. If this regenerative process be properly conducted, and the plant not worked beyond its capacity, only the merest traces of oxides of nitrogen will pass the scrubbers, and these can be recovered by absorption with strong sulphuric acid, so that the residual nitrogen and the excess of oxygen finally pass away from the apparatus absolutely free. It will be seen at once that this is a most important feature in a process involving the use of large quantities of so costly a material as nitric acid.

The apparatus you see built up before you has been designed as nearly as possible from Donald's specification, and, I think, will show you fairly well how the inventor, when framing this, intended to work the process on the large scale.

The sulphuric acid that has done duty in the absorber is mixed with nitric acid to form the decomposing mixture above mentioned. When the action of the hydrochloric acid upon this has removed the nitric acid the sulphuric acid remains behind, weakened, it is true, by the absorption of the water formed in the process, but still sufficiently strong to act as a drier upon the pot or roaster gases. It is then evaporated to say 150° Tw. and used for decomposing a subsequent batch of salt. Thus you will notice that it makes its entrance, so to say, at the end of the series of operations, and moves steadily forward, stage by stage, to its exit at the beginning. You will also notice that the nitric acid moves in a sphere equally important and equally well defined. It is perpetually being pulled to pieces and put together again. By its decomposition with hydrochloric acid gas it is robbed of its water and a portion of its oxygen; by absorption in dilute nitric acid, and subsequent treatment with air, this water and oxygen are restored, and it returns to the scene of its first labours as efficient as ever.

I am sorry Mr. Donald is unable to be here, as he could have gone more deeply into the matter than I can possibly do. Standing as I do in the position of having been consulted by both Mr. Donald and the Taylor Syndicate, I am only at liberty to draw upon such materials for this paper as are accessible to everyone that may be interested in this subject, but I think I have said sufficient to shew you that the nitric acid chlorine process has passed the fairy-tale stage of its history—that it is no longer confined to the realm of myth and legend, but has entered upon the field of actual, and, I may say, startling possibilities. I hope that before long we may meet together again these rooms to hear news of further development, and in the meantime I would advise those most interested in the matter to consider what will be the position of affairs when possibilities have become realities, and the Weldon Process a thing of the past.

FRENCH AGRICULTURE IN 1789 AND 1889.*

THE area of land capable of cultivation in France is about 47½ million hectares, one-third of which is taken up with cereals (15,440,000 hectares), this being an increase of about two million hectares since 1789 (one hectare corresponds to about 2½ acres). At that date 10 million hectares of land were lying fallow, whilst to-day no more than one-third of that area (3,644,000 hectares) is in the same condition. A hundred years ago there were 7,600,000 hectares of moorland, which have now been reduced to 3,889,000 hectares. In other words, about one-fifth of the cultivatable land has been actually brought under cultivation in the hundred years, and now bears crops. The land laid out in gardens and orchards has remained practically the same, while vineyards have increased almost one-twentieth.

The extension of cultivation, due to the reclamation of moorland and the reduction of the amount of fallow land, has taken effect principally in the formation of natural and artificial pastures, and the increased production of fodder and potatoes, as is shown by the following numbers:—

	1789.	1889.
	Hectares.	
Potatoes	4,300	1,488,000
Artificial meadows (land sown with grass or clover)	1,000,000	3,253,000
Root crops	100,000	1,397,000
Meadows and pastures	3,000,000	5,827,000

This increase in the cultivation of plants intended for feeding cattle naturally indicates that the number of domestic animals has undergone a large increase during the century; the number of horses in 1789 was 2,400,000, and has risen to 2,900,000, an increase of about one-fifth. The number of cattle, however, has been almost doubled, rising from 7,655,000 in 1789 to 13,400,000 in 1889. There are fewer sheep in France at the present time than there were a hundred years ago, 23 millions now, against 27 in 1789. As to pigs, the statistics of 1789 are silent, but their numbers decreased from 23 millions in 1840 to 7 millions at the present day, the difference being more than covered by importation.

*From an article by Mr. Grandeau in the *Temps*.

The production and consumption of meat have proceeded on parallel lines to the alteration in the number of cattle which we have just mentioned. The total consumption of meat in France in 1789 was 4½ million kilogrammes (1 kilogramme = 2 lbs., or 50 kilos. = 1 cwt.), corresponding to a mean annual consumption of 17 kilos. per head of the inhabitants, and a total value of 203 million francs. The actual consumption at present is 30·360 kilos. per head, representing a total weight of 1,200 million kilos., and a value of 1,632 million francs. These numbers, which have changed so largely during a century, show how small the consumption of meat still remains among us, and what an enormous gap remains to be filled by home production in the animal food of our population. Lavoisier estimated the production of wheat in 1789 at 31 million hectolitres (1 hectolitre = 2¼ bushels). The present production is 110 millions, 15 of which are required for the crop of the following year, and 4 million are employed for industrial purposes, leaving 90·92 million hectolitres disposable for food, while about 104 millions are required. The consumption of corn in the period about 1834 was 1·64 hectolitres per inhabitant, whilst it is now 2·70 hectolitres. The area devoted to wheat amounted in 1789 to only about one-third of the whole amount employed for cereals—say 4 out of 13 millions; to-day it amounts to 7 millions, and makes up one-half of the whole cereal producing area. A hundred years ago the middle class scarcely knew of the use of wheaten bread, whilst to-day, in the greater part of France, wheaten bread is gradually replacing that made with rye, oats, and buckwheat. But here too much remains to be done. Our mean harvest is seven times the amount sown, and amounts to 15 hectolitres per hectare. It will have to increase by 2 or 3 hectolitres if the use of wheaten bread is everywhere to replace that of the inferior cereals. This result, as our readers are aware, is easy to attain.

Let us now inquire into the increase of the value of agricultural produce in France. Lavoisier estimated the total value of the products obtained in 1789 from arable land, meadows, and vineyards, at 2,000,750,000 francs. It had increased by 1840 to 3,000,627,000 francs, amounted to 7,664,000,000 in 1862, and now stands at the figure of 8,000 million francs (£320,000,000).

It is beyond doubt that, although this very marked increase in the value of agricultural produce in France is largely due to the activity and industry of our worthy agricultural population, yet the increasing action of public authorities in aid of education and the introduction of scientific methods of treating the soil and of handling cattle may justly claim a share in the progress which has been made.

Almost completely deprived of all encouragement—financial and otherwise—agriculture was formerly given up to routine methods, without schools, without teaching of any description, was, as it were, bound to a stationary condition which it was beyond the power of any individual efforts to appreciably modify. The Government of the Republic has, however, rightly understood the function of the State with regard to agriculture, its proper duty being, before all, the development of instruction and the propagation by all possible means of applications of chemical and biological science to the cultivation of plants and the rearing of animals. The rapid increase of advantages accorded to agriculture and the development of agricultural instruction of all kinds, which has distinguished the last twenty years, has been rendered visible to the visitors to the Paris Exhibition by an ingenious arrangement of gilded cubes, which represent, by their increasing size, the annual votes made by the State for general agricultural purposes during the century.

In 1789, the expenditure under this heading amounted to 112,800 francs; in 1829 to 297,828 francs; to 698,000 francs in 1849, and to as much as a quarter of a million francs in 1869. It has now risen to 8,339,000 francs, a sum which is still small enough, if we judge from what has already been effected, the progress which yet remains to be made in increasing the wealth of the country by large grants for agricultural education in all its forms. It appears even less considerable when compared with the amounts expended on this object by other nations. But whatever remains still to be desired, the agriculturists of France can never, without ingratitude, refuse to appreciate the interest which public authorities are showing on their behalf, and to acknowledge the steady improvement caused by their liberality in the condition of the various agricultural stations. Although small in comparison with many foreign budgets, the actual amount paid by the Minister of Agriculture leaves far behind the wretched sums which were doled out to agriculture by the Governments anterior to 1870. The last ten years have been particularly fertile in useful innovations. They have witnessed the restoration of the Agricultural Institution, the birth of schools of practice and of the departmental chairs of agriculture, the reorganization of our great national veterinary schools, the establishment of experimental plots for teaching purposes, and, finally, the increase of our agricultural stations and laboratories.

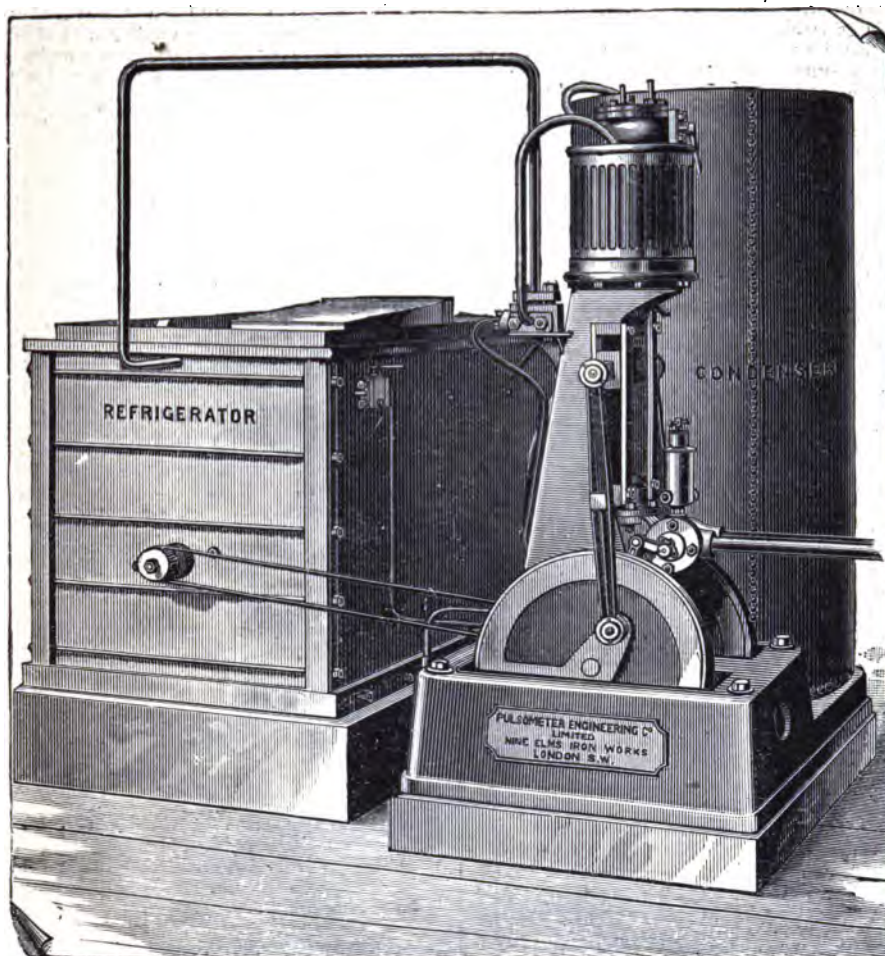
All these institutions were worthily represented at the Paris Exhibition, and gave evidence of their vitality by the large amount of scientific and practical work they had produced during the ten years of their existence.

A QUICK FREEZING REGENERATIVE ICE-MAKING APPARATUS.

THIS machine, made by the Pulsometer Engineering Company, of London, is designed to produce ice in blocks of about $1\frac{1}{2}$ " to 3" thick continuously, after the brine has been reduced to the proper temperature. The illustration shows a machine which will make about 40 lbs. of ice per hour. The apparatus is of the simplest construction and very cheap. It comprises a steam cylinder driving a compression pump direct. The ice-moulds and refrigerator are all contained in one

tank, and the arrangement is such that the refrigerator cannot frozen up. The condenser is contained in a circular tank, fixed on same base-plate that carries the engine, and therefore the machine is self-contained, and no expensive fixing or foundations are required. The apparatus is so arranged that it can also be used for cooling liquids or refrigerating rooms to any desired temperature.

Its functions are controlled by a single valve, and the mechanism is so simple that it can be operated by persons quite unfamiliar with machinery, and for this reason the machine is specially applicable for cooling liquids, gases, &c., and in all other trades where skilled mechanics are not employed.



SULPHUR COMPOUNDS IN CRUDE PETROLEUM.

IN a recent number of the *Bericht der deutschen chemischen Gesellschaft*, Charles F. Mabery and Albert W. Smith have contributed a note on the results of their investigation on the sulphur compounds of the crude petroleum from the Ohio Oil Field. They find that on fractionating the crude oil, the sulphur compounds collect in the portion boiling between 200° and 300° C, and that they can be easily separated from this fraction by the addition of concentrated sulphuric acid. From this acid solution, after neutralising with lead carbonate or lime, the compounds separate on warming. They appear to be very unstable, but when the aqueous solution is distilled, a yellow oil collects in the distillate, which contains 14.97 % of sulphur. When they attempted to distil the oil, it decomposed, evolving sulphuretted hydrogen. Under diminished pressure the oil was fractionated into portions which, on being tested, contained no thiophene or mercaptan compounds, but consisted of various organic sulphides. The portions having the lowest boiling point yielded on distillation a hydrocarbon which formed a bromine addition compound of the formula $C_{17}H_{14}Br_2$. By the addition of alcoholic mercuric chloride they also succeeded in isolating the double compounds of methyl, ethyl, and propyl sulphides, and obtained indications of the presence of butyl sulphide.

SOME EXPERIENCES WITH ZINC.

ZINC is often used in boilers and hot water tanks to prevent the corrosive action of the water on the metal of which the tank or boiler is composed. The action appears to be an electrical one, the iron being one pole of the battery and the zinc being the other. Under the action of the current of electricity so produced, the water in the tank is slowly decomposed into its elements, oxygen and hydrogen. The hydrogen is deposited on the iron shell, where it remains. It will not unite with iron to form a new compound, but if any iron rust (known to chemists as oxides of iron) is present, it will remove the oxygen from this and deposit the metallic iron on the plates. The oxygen of water that is decomposed, instead of going to the iron, goes to the zinc and forms oxide of zinc, and in the course of time the zinc will be found to be almost entirely converted into oxide, only a small fraction of original metal being left.—*Invention.*

"FROM COAL TO CALICO."—A lecture under this title was given by the Rev. W. G. Whittam last Friday before the Eastbourne Natural History Society. Dealing with the aniline colours, the lecturer estimated the annual saving to the country by their use, instead of the madder-root preparations, at £4,000,000.

PRIZE COMPETITION.

More than twelve months ago, one of our friends stated that it might be well to invite articles for, on some subject of special interest to our giving a prize for the best contribution, he at the offering to defray the cost of the first prize, and a subject in which he was personally interested. Late we were totally unprepared for such a suggestion on thinking over the matter at intervals of have come to think that the elaboration of such a did not only prove of benefit to the manufacturer, go some way towards defraying the holiday the prize winner.

herefore prepared to receive competitions in the subjects:—

SUBJECT I.

method of pumping or otherwise lifting or forcing out hydrochloric acid of 30 deg. Tw.

SUBJECT II.

method of separating or determining the relative of tin and antimony when present together in compounds.

subject, the following prizes are offered:—

prize of five pounds, one second prize of one additional prizes to those next in order of merit, of a free copy of the *Chemical Trade Journal* for this.

petition is open to all nationalities residing in any world. Essays must reach us on or before April Subject II, and on or before May 31st, in Subject I. will be announced in our issue of June 28th.

we to ourselves the right of publishing the contents of any competitor.

ay be written in English, German, French, Spanish

Trade Notes.

OF SALT EXPORTS IN CHESHIRE.—The export list in the Custom-house returns and the home trade show that a quantity of salt exported from Cheshire was only 35,531 74,161 tons for March of last year. The decrease is for example, the United States took only 2,367 tons, against March of last year; British North and South America took against 16,233 last year; Africa, 2,155 tons, against 3,417; India, and other Asian ports, 15,501 tons, against 40,384; the parts of Europe, 2,916 tons, against 4,148. The amount January and February is a little in favour of this year's total of 119,267 tons, against 106,293. The falling off attributed to the agitation over the coal trade and to a rise in the *Times*.

LOCOMOTIVE COAL.—As the time approaches for entering usual yearly contracts for the supply of locomotive fuel, companies in particular are now showing a good deal of concern, as there does not appear to be any question that for the ensuing year will be much higher than those now in force for 1889, most of the companies were supplied with the best "hards" at about 6s. per ton; in July, 1889, the price from that date was raised to 8s. 6d., and in the early part of the year the tender for the North-Eastern was 10s. 6d. per ton, at least, is expected to be the one that will be in force at the end of June. This will make the increase in the price of fuel equal to 75% in less than two years. How it will work out, way companies will be gathered from the fact that before the price of steam coal the London and North-Western Co. a year for coal and coke for locomotives, the Midland Co., the North-Eastern, £200,000., and the Great Eastern like £190,000. The South Yorkshire Steam Coal Co., who supply several railway companies with steam coal, meeting at Barnsley on Wednesday evening, when it was found that the prices now obtained for steam coal ranged from 10s. 3d. to 11s. 6d., whilst, with the increase in the price of coal, there was no advance in the cost of nearly every colliery require-

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

A steady business continues to be done in soda ash and caustic soda, and prices are well maintained for early deliveries. Ordinary grades of soda ash at 1½d. to 1¾d.; refined, 1¾d. Caustic soda, 70%, £9. 17s. 6d. per ton on rails; 60% at £8. 17s. 6d., and cream, 60%, at £8. 12s. 6d. Saltcake, 25s. per ton in bulk. Bleaching powder has had a distinct decline in value, and offers for spot delivery at £5. per ton on rails, and for April-June at lower figures. Chlorate of potash 5d. per lb.; makers quoting forward 5¼d. per lb. Soda crystals, £2. 15s. to £3. per ton in bags and casks respectively. Vitriol and muriatic acid continue to find a ready outlet, and prices are firm. Sulphur in all grades is quiet and without change in value. Sulphate of copper, £25. per ton nearest spot value; £24. per ton for May-June; and for June-December, £20. to £21. per ton. Oxalic acid scarce and now quoted 4d. per lb. Aniline salt and oil firm, and in rather better demand. Carbolic acids, crude and crystal, distinctly weaker, and offered within the week at considerable concessions on prices lately ruling: crystals 34° now at 9¼d. to 9½d. per lb. Pale liquid unchanged at 1s. to 1s. 1d. per gallon. Acetates of lime quiet, but the market on the whole is firm at £8. for brown, though some parcels have been changing hands at lower figures; grey, £13. 15s. per ton. Acetate of soda, £16. 10s. per ton. Acetic acids generally are quiet and without change in value. Lead salts: both nitrate and acetate are quiet; prices unaltered. Tin crystals rather lower at 6½d. per lb. Yellow prussiate of potash 9¼d. per lb., but some odd parcels offering a shade under this. Potash, carbonate, and caustic maintain a firm position, and are commanding rather higher prices. All sundry chemicals for textile trades continue dull; and there is very little movement in prices.

METAL MARKET REPORT.

	Last week.		This week.
Iron	48/9	....	46/0
Tin	£90 0 6	....	£89 7 6
Copper	48 0 0	....	48 10 0
Spelter	20 12 6	....	20 7 6
Lead	12 12 0	....	12 10 0
Silver	44d.	....	45¾d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	16¼ 16¼	....	16¼ 16¾
Mason & Barry	6¼ 6¼	....	6¼ 6¾
Tharsis	4½ 4½	....	4½ 5
Cape Copper Co. ..	3½ 3½	....	3½ 3½
Namaqua	1¼ 2	....	1¼ 2½
Copiapó	2½ 2½	....	2½ 2½
Sanulcillo	1 1½	....	1 1½
New Quebrada	¾ ¾	....	¾ ¾
Libiola	2½ 2½	....	2½ 2½
Tocopilla	1/- 1/6	....	1/- 1/6
Argentella	3d. 6d.	....	3d. 9d.

THE COPPER MARKET.

From Messrs. Harrington and Co.'s report of the 16th we note that the total Chili charters since January 1st have been only 7,600 tons, as against 9,900 tons for the same time last year. The actual stocks of copper in English and French warehouses are 87,770 tons, as compared with 118,503 tons at same date last year. The Tharsis Sulphur and Copper Co. will pay next month a dividend of 20% for 1889, being the same as paid for 1888.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

There has been rather a better turnover in the general market, as was expected, the break of prices having given a much needed impetus to buying. The drop is pretty general here, as elsewhere, but with us bleaching powder perhaps shows slightly stiffer than either in Lancashire or on Tyne, and last week's quotations are about maintained.

Refined alkali, chlorate of potash and sulphate of copper are all lower, and caustic soda has made a further drop all along the line, to the distinct promotion of business, the bulk of orders placed being much larger than for the past few weeks. Borax has gone up 10s., this forming the only exception of note. Sulphate of ammonia in this market, for whatever reason, has gone worse and worse, and to-day it has passed hands certainly at as low a figure as £11. 6s. 3d., and probably at £11. 5s. The price, spot, Leith must stand, therefore, as £11. 5s. to £11. 7s. 6d. on even the most favourable interpretation. Forward business has come down correspondingly, and delivery two or three months ahead has been fixed at £11. 10s. if not lower. Chief prices current are:—Soda crystals, 52s. 6d., less 2½% Glasgow; alum in lump £5. 5s., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¾d. net Tyne; caustic soda, white, 76°, £12. 10s., 70/72°, £10. 2s. 6d., 60/62° £9. 5s., and cream, 60/62° £8. 15s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1¾d., net Tyne; saltcake, 30s.; bleaching powder, £5. 10s. to £5. 15s., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¾d., less 5% any port; nitrate of soda 8s. to 8s. 3d.; sulphate of ammonia, spot, £11. 5s. to £11. 7s. 6d. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25., less 5% Liverpool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3¾d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¾d. to 7d. at Glasgow for Scotch consumption (English orders done at about 1d. a gallon lower); ditto (lubricating), 86½, £5. 10s. to £6. per ton; 88½, £6. 10s.; and 890/895, £7. 10s. to £8. Week's imports of sugar at Greenock were 13,404 bags.

REPORT OF MANURE MATERIAL.

There continues to be a good prompt business passing at some decline for nitrogenous, but at steady prices for phosphatic material. The position of mineral phosphates is without change, there being nothing in prices quoted to induce purchasing ahead, and manure manufacturers being too busily engaged getting out their manures to have much time for considering their next season's requirements. Prices last quoted must, therefore, be taken as nominal values of to-day.

We don't hear of any business in cargoes of bones, and anything arriving at port of call will be now almost too late for the present season. Further sales of East India crushed bones have been made at £5. 3s. 9d. per ton ex quay Liverpool, which is nearest closing value. Sales of Bombay bone meal have been made at £5. 10s. per ton, to arrive, ex quay, and this price has also been accepted for a good line ex store Liverpool. Several parcels of common grinding bones arrived at Liverpool have been sold at £4. 10s. for a rough and dirty Turkish parcel, up to £4. 18s. 9d. for clean, dry parcels, and the good demand for this class of bones has kept the market steady in face of rather large arrivals.

Nitrate of soda is just steady. Spot price remains 8s. per cwt. Due cargoes are worth about 7s. 10½d. to 8s., according to size and quality. Buyers do not seem much disposed to give the higher prices demanded for autumn arrival, and consequently we do not hear of any important business in that position.

Further sales of River Plate dried blood have been made at 10s. per unit of ammonia, ex-store Liverpool, which price must be quoted as the nearest present value. For home prepared, 10s. 6d. to 10s. 9d. per unit required, according to position of the works in relation to market.

Nine shillings per unit of ammonia f.o.r. at works, is quoted for ground hoof, in bags, gross weights.

Kainit remains as last quoted, at 38s. to 40s. per ton, in bags, delivered free to rails, according to quantity.

Superphosphates remain as quoted a week ago, at 46s. 3d. per ton, net cash, in bulk, delivered f.o.r. at works, the bulk of the stuff in second hands having been placed, and at lower prices.

THE TYNE CHEMICAL REPORT.

TUESDAY.

The Chemical Market continues quiet with little business doing, and prices seem to be tending to the normal condition they were in previous to the late advance. Caustic soda has dropped 30s. a ton since last report. Bleaching powder is 5s. to 10s. a ton lower; soda ash about 5s. per ton in favour of buyers. Crystals are very firm at late quotations, and stocks said to be very light; sulphate of soda quiet, but no change in price. To-day's quotations are:—Caustic soda 77%, £11. 10s. per ton; pure ground caustic in 3 and 4 cwt. barrels, £15.

per ton; bleach powder, in softwood casks, £5. 10s. per ton; sod ash, 1¾d. per degree, less 7½%; soda crystals, in casks, 52s. 6d. to 55s. per ton; in 2 cwt. bags, £2. 15s. per ton, net weight; in 1cwt bags, £2. 17s. 6d. per ton, net weight; sulphate of soda, ground, 1 casks, £2. 5s. per ton; in bulk, £1. 15s. per ton; chlorate of potash 5d. per lb.; recovered sulphur, £4. 5s. per ton; silicate of soda 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, 1 cwt. kegs, £5. 15s. per ton, in 5–7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chlorid of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—a f.o.b. Tyne, or f.o.r. makers' works. Small coals continue in good demand. Manufacturers have great difficulty in getting deliveries owing to supplies being curtailed in consequence of the short time worked by the miners last week.

Northumberland steam small quoted at 8s. to 8s. 6d. per ton, and Durham small at 10s. per ton.

The Durham miners have made application, through their Association, for a further advance of 15 per cent. The owners have deferred the consideration of the matter until the selling price has been ascertained for the three months ending 31st March.

TAR AND AMMONIA PRODUCTS.

The Tar products market remains in much the same condition as reported last week. Benzoles, both 90's and 50/90's selling at old rate: though we hear various accounts of the prices at which actual business has been done. Solvent naphtha is still in good demand, and creosote remains a good market. Crude carbolic acid and anthracene are both very dull, and prices do not seem inclined to mend. Pitch is also weak with but little demand.

In sulphate of ammonia, the lower prices have induced a fair amount of business, and, on the whole, the position has now assume a steadier appearance. The business for Hull delivery has been limited, prices varying from £11. 7s. 6d. to £11. 10s. The bulk of the transactions has been negotiated for delivery f.o.b. Leith, principally in forward contracts at £11. 7s. 6d. Quotations f.o.b. Liverpool stand at £11. 7s. 6d. Beckton stands nominally at £11. 10s. which price is also the value for outside makes.

THE LIVERPOOL MINERAL MARKET.

Our market has continued strong, and the late advance has been well maintained. Manganese: Arrivals are proportionately small prices unaltered. Magnesite: Stocks of raw lump continue large, and prices are very easy. Raw ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand) in increased demand; very strong prices—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals this week have increased, but all have practically gone into consumption; prices, therefore, are firm at last figures, especially the G.G.B. "Angel-White" brand—90s. to 95s. medium, 100s. to 105 superfine. Barytes (carbonate) continues easier; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nut 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s. ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., and specially selected lump, finest quality, £13. Iron ore unaltered. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland strong demand at 18s. to 24s. Purple ore steady at last quotation Spanish manganiferous ore selling freely at good prices. Emery-stone: Best brands still scarce both for spot and forward delivery; price firmer. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. 5s. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow fine impalpable ground, £7. Scheelite, wolfram, tungstate of sod and tungsten metal inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: The present demand has been supplied by fairly large arrivals, prices, however, are unaltered. Antimony ore and metal have further advanced. Uranium oxide 24s. to 26s. Asbestos: Best rock, £17. to £18.; brown grade £14. to £15. Potter's lead ore: Prices are firm; smalls, £14. £15.; selected lump, £16. to £17. Calamine: Best qualities scarce 60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore demand, firm at 22s. to 25s. Plumbago: steady; Spanish, £6. best Ceylon lump at last quotations; Italian and Bohemian, £4.

on; founders, £5. to £6.; Blackwell's "Mineraline,"
ch sand, in cargoes, continues scarce on spot—20s.
Ferro-manganese and silicon spiegel in good demand
figures. Chrome iron, 20 per cent., £24. to £25.
a, £50. China clay freely offering—common, 18s. 6d.;
in 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

LIVERPOOL COLOUR MARKET.

Unaltered. Ochres: Oxfordshire quoted at £10.,
14., and £16.; Derbyshire, 50s. to 55s.; Welsh,
to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish,
40s. to 45s.; French, J.C., 55s. 45s. to 60s.; M.C.,
6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.;
50s. to 55s. White lead, £21. 10s. to £22. Red lead,
oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23.,
ed, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black,
ue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra
st white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto
s, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron,
ry, £10. to £15. Paris white, 60s. Emerald green, 10d.
erbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

New Companies.

AND PREECE, LIMITED.—This company was registered on the 1st;
capital of £25,000, in £10. shares, to take over the business of electrical
ried on by Thomas Reginald Andrews and Thomas Preece, at the
lis, Bradford, York. 300 of the shares are deferred shares, to rank for
six per cent. has been paid on the ordinary shares. The subscribers

Shares.
rews, Bradford 1
reece, Bradford 1
nson, Thornleigh, Appleby, electrician 1
gatroyd, Halifax 1
h Brayshaw, Manningham, draper 1
glas, Bradford, electrical engineer 1
f, Bradford, accountant 1

PHOSPHATE COMPANY, LIMITED.—This company was registered on
with a capital of £5,000, in £1. shares, to acquire and work mining
hts, lands, and property in Canada or elsewhere. The subscribers

Shares.
on, Sylphide-villas, Forest-hill, clerk 1
ry, 10, Dusaney-road, West Kensington, clerk 1
nett, Mackenzie-road, Beckenham, clerk 1
er, Fenchurch-avenue, merchant 1
4, Fenchurch-avenue, chemical broker 1
ney, 11, Queen Victoria-street, clerk 1
ney, 11, Queen Victoria-street, clerk 1

PORTLAND CEMENT COMPANY, LIMITED.—This company was regis-
nd inst., with a capital of £25,000, in £5. shares, to purchase from
n, of Millwood-house, Grays, Essex, cement manufacturer, certain
for the manufacture of concrete and metal telegraph poles, signal and
other articles. The subscribers are:—

Shares.
allet, 15, Billiter-street, merchant 1
1, West India-road, E., merchant 1
unr., 14, St. Mary-axe, ship-owner 1
son, Grays, Essex, cement manufacturer 1
105, Leadenhall-street, insurance broker 1
ove, 54, Comerford-road, Brockley 1
h, Hainault-road, Leytonstone, clerk 1

Gazette Notices.

Partnerships Dissolved.

S. A. BISHOP and C. FOREMAN, under the style of Brittan and Foreman
Hermes-street, Pentonville, London, telegraphic instrument makers.
G. TAYLOR, H. MATTINSON, and J. TAYLOR, under the style of A. and G.
Taylor, Bradford, Leeds, Huddersfield, and Dewsbury, photographers, as far as
regards J. Taylor.

Adjudications.

JOSEPH ABRAHAM, Bristol, soapmaker.
WALTER SLOCOMBE, Romford, oil and colourman.

The Patent List.

This list is compiled from Official sources in the Manchester Technica-
Laboratory, under the immediate supervision of George E. Davis and
Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Sterilizing Liquids by Magnetism. A. de Méritens. 5,048. April 1.
Electricity. " 5,049. April 1.
Softening Brittle Paper Pulp. C. Kellner. 5,053. April 1.
Bleaching Fibrous Material by Electricity. C. Kellner. 5,054. April 1.
Apparatus for Manufacturing Sulphuric Acid. E. Delplace and J. Delplace.
5,058. April 1.
Steam Boilers.—(Complete Specification.) W. H. Smith and W. A. Knapp
5,063. April 1.
Steam Boilers.—(Complete Specification.) N. P. Towne. 5,064. April 1.
Treatment of Phosphatic Minerals. L. Mond. 5,072. April 1.
Inclined Gas Retorts. C. Hunt. 5,078. April 1.
Electric Cables.—(Complete Specification.) H. H. Lake. 5,087. April 1.
Steam Boiler Furnaces. W. H. Wilson and J. Welsh. 5,117. April 2.
Modifying the Properties of Fibres for Paper Making. C. Kellner.
5,128. April 2.
Water Tube Steam Boilers. T. W. Lapworth and A. W. Hayes. 5,130.
April 2.
Coating Surfaces with Metal. W. A. Thoms. 5,140. April 2.
Cold Air Refrigerating Machines. W. Garden. 5,152. April 2.
Manufacture of Colouring Matters. The Clayton Aniline Co., Limited and
J. Hall. 5,155. April 2.
Charging and Discharging Gas Retorts. S. J. Woodhouse. 5,163. April 3.
Brickmaking Machinery. G. H. Shanks, P. R. Tardew and J. Andrews.
5,175. April 3.
Brick and Tile-making Machinery. S. Witt, jun. 5,180. April 3.
Brickmaking Machinery. J. Dixon and R. T. Dixon. 5,188. April 3.
Colour Printing on Textiles. W. Dorrington. 5,190. April 3.
Gas and Petroleum Motors. A. G. Melhuish. 5,192. April 3.
Treatment of Coke. G. Waller. 5,194. April 3.
Treatment of Copper Nickel Matte. Electric Construction Corporation
Limited, T. Parker, and A. E. Robinson. 5,199. April 3.
Sulphate of Ammonia Saturators. T. Wilton. 5,205. April 3.
Explosives. H. H. Lake. 5,209. April 3.
Instantaneous Production of Water Gas. J. Blum. 5,239. April 5.
Mixing Apparatus. J. Rowley and J. W. Rowley. 5,241. April 5.
Apparatus for Carburetting Water Gas. H. Fourness. 5,243. April 5.
Multiple Effect Evaporating Apparatus.—(Complete Specification.) A.
Chapman. 5,267. April 5.
Reducing Valves. J. Kirkaldy. 5,277. April 5.
Steam Boilers. J. Kirkaldy. 5,278. April 5.
Washing and Cleaning Raw Sugar. G. F. Redfern. 5,282. April 5.
Manufacture of Sugar. G. F. Redfern. 5,283. April 5.
Bleaching Vegetable Fibres. C. Kellner. 5,285. April 5.
Manufacture of Phosphates. L. J. de Graef. 5,287. April 5.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

ending April 8th.

450. Beresford & Co.

de—

37. Taylor, Sommerville, &

Co.

Ore—

30 t. Pillow, Jones, & Co.

52. H. R. Merton & Co.

70. Pillow, Jones, & Co.

id—

30 pks. Fuerst Bros.

15 pks. A. & M. Zimmermann

Acetate of Lime—

U. S., £220. Lister & Biggs

" 220 "

Ammonia—

Holland, £150. H. Lorenz

Bones—

N. S. Wales, 3 t. 8 c. Leach & Co.

Holland, 200 t. Ang.-Cont. G. Works

E. Indies, 100 C. C. Bryden & Co.

Bone Meal—

E. Indies, 250 t. J. Mitchell

Brimstone—

Italy, 10 t. F. & L. Sitzler

" 29 18 c. G. Boor & Co.

" 21 H. S. Smith & Co.

" 5 A. Hughes

" 25 A. Zumbeck & Co.

" 32 Pigon, Wilks, & Co.

Barytes—

Germany, 38 cks. Burrell & Co.

" 6 H. Lambert

" 23 W. Harrison & Co.

Belgium, 38

" 20 W. A. Rose & Co.

" 41 Magee, Taylor, & Co.

" 20 Leach & Co.

" 20 W. A. Rose & Co.

" 44 Magee, Taylor, & Co.

Germany, 23 W. Harrison & Co.

Cream of Tartar—

Holland, 20 pks. Middleton & Co.

France, 4 B. & F. Wf. Co.

" 6 W. E. Pantin

France, 5 pks. M. Ashby

Spain, 35 W. C. Bacon & Co.

" 6 F. Smith

Copperas—

Germany, £75. Charles & Fox

Chemicals (otherwise undescribed)

Holland, £8. A. & M. Zimmermann

Germany, 30 T. H. Lee

" 408 A. & M. Zimmermann

E. Africa, 213 T. H. Lee

" 120 A. & M. Zimmermann

Germany, 169 Haeffner & Co.

" 14

Caoutchouc—

E. Indies,	13 c.	Ross & Deering
"	80	Henderson Bros.
E. Africa,	90	L. & I. D. Jt. Co.
"	7½	Kebbel, Son, & Co.
France,	330	T. H. Lee
E. Indies,	66	R. & J. Henderson
"	100	Kaltenbach & Schmitz
E. Africa,	108	Phillips & Graves
"	57	Kebbel, Son, & Co.
"	39	W. Johnston & Co., Ltd.
Str. Settlements,	109 c.	E. Boustead & Co.

Caustic Potash—

France,	2 pks.	Beresford & Co.
"	21	F. W. Berk & Co.

Dyestuffs—

Cochineal		
Canaries,	12 pks.	Bruce & White
Saffron		
Spain,	1 pk.	Lavington Bros.
Myrabolams		
E. Indies,	173 pks.	L. & I. D. Jt. Co.
"	667	Marshall & French
"	650	"
"	607	Baxter & Hoare
Gambier		
E. Indies,	342 pks.	W. H. Cole & Co.
"	25	Hoare, Wilson, & Co.
"	175	Elkan & Co.
"	427	Kleinwort, Sons, & Co.
"	13	S. Barrow & Bro.
"	205	Beresford & Co.
"	558	R. & J. Henderson
"	213	L. & I. D. Jt. Co.
"	179	Brinkmann & Co.
"	214	L. & I. D. Jt. Co.

Indigo

E. Indies,	37 cts.	"
"	13	Benecke, Souhay, & Co.
"	12	W. Brandt, Sons, & Co.
"	68	A. Harvey
"	60	Ernsthausen & Co.
Spain,	1 sm.	L. & I. D. Jt. Co.
France,	91	"
E. Indies,	5 cts.	Langstaff & Co.
"	149	Henderson Bros.
"	15	H. J. Pearlback & Co.
"	125	L. & I. D. Jt. Co.
"	12	Arbutnot, Latham, & Co.
"	3	F. W. Heilgers & Co.
Germany,	4	Parsons & Keith
E. Indies,	5	Elkan & Co.
"	4	Patry & Pasteur
"	3	Stansbury & Co.
"	34	L. & I. D. Jt. Co.
"	69	Ernsthausen & Co.
"	91	L. & I. D. Jt. Co.

Tanners Bark

Belgium,	10 t.	H. Heule's Succrs.
"	22½	Prop. Scott's Wf.
"	10	Fardell & Co.
"	20	Boutcher, Martimer, & Co.
S. Australia,	50 t.	Hicks, Nash, & Co.
Argols		J. Vicary & Sons
Italy,	426 pks.	B. Jacob & Sons
"	347	"
"	923	"
Sumac		
Italy,	750	Brown & Elmslie
"	250	L. & N. W. Ry. Co.
"	600	J. Kitchen
"	50	W. France & Co.
"	309	A. Laming & Co.
"	210	Beresford & Co.
"	50	H. Johnson & Sons

Extracts

Holland,	59 pks.	Burt, Boulton, & Co.
Belgium,	8	T. H. Lee
Holland,	6	Kaltenbach & Schmitz
France,	50	L. J. Levinstein & Sons
U. S.,	25	J. Graves
France,	80	L. J. Levinstein & Sons

Orehella

Portugal,	55 pks.	L. & I. D. Jt. Co.
Valonia		
Greece,	40½ t.	J. Graves
A. Turkey,	51	Hicks, Nash, & Co.
"	102	J. Graves

Annatto

St. Vincent,	1 pks.	Lee, Crerar, & Co.
Cutch		
E. Indies,	127 pks.	Anderson, Weber, & Smith

Glycerine—

E. Africa,	170	T. H. Lee
Germany,	73	A. & M. Zimmermann
Holland,	15	Beresford & Co.
Germany,	9	H. Lambert
Holland,	400	Spies, Bros., & Co.
Germany,	42	Beresford & Co.

Guano—

Norway,	135 t.	Jensen & Co.
"	183	"

Glucose—

Germany,	200 pks.	200 c.	J. Barber & Co.
"	200	400	"
"	65	524	L. Sutro & Co.
"	40	317	Pillow, Jones, & Co.
U. S.,	50	250	A. J. Humphrey
"	75	375	T. M. Duché & Sons
"	35	210	Hyde, Nash, & Co.
"	800	800	A. Dawson
"	25	125	M. D. Co.
Germany,	115	219	"
"	1	7	Stein Bros.
"	200	200	Dutulle, Solomon, & Co.
France,	100	100	"
"	500	500	Carey & Sons
"	400	400	Trier, Meyer, & Co.
"	220	220	J. Barber & Co.
Germany,	15	122	T. H. Lee
"	25	235	R. G. Hall & Co.
U. S.,	74	571	J. Knill & Co.
"	60	500	P. W. Hore
"	800	800	A. Dawson
"	45	275	M. D. Co.
"	100	500	P. Windmuller
"	200	1,140	C. Czarnikow

Gutta Percha—

E. Indies,	1,085 c.	Kaltenbach & Schmitz
"	2,265	R. J. Henderson
"	430	H. W. Jewesbury & Co.
"	76	Kleinwort, Sons, & Co.

Isinglass—

Str. Settlements,	70 pks.	L. & I. D. Jt. Co.
E. Indies,	9	"
"	10	Hale & Sons

Manure—

Germany,	50 t.	F. W. Berke & Co.
Phosphate Rock		
Belgium,	260 t.	De de Pass & Co.
"	227	Andrew Hunter & Co.
"	205	Miller & Johnson
"	130	Lawes Manure Co.
"	130	Anglo Contl. Guano Wks. Agency

Manganese—

France,	2 t.	R. Wolff & Co.
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Naphtha—

Germany,	16 drs.	Stein Bros.
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Potassium Carbonate—

France,	12 pks.	Beresford & Co.
"	10	J. A. Reid
"	18	Charles & Fox
Holland,	1	H. Boyce

Potassium Permanganate—

Holland,	10 pks.	H. Boyce
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Potassium Silicate—

Holland,	20 pks.	Beresford & Co.
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Potassium Sulphate—

Holland,	65 pks.	H. Lambert
France,	43	J. Knight & Son

Pearl Ash—

France,	64 c.	Petri Bros.
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Plumbago—

Holland,	105 cks.	Brown & Elmslie
Ceylon,	32	Doulton & Co.
"	302	Thredder, Son, & Co.
France,	2	Hernu, Peron, & Co.
Ceylon,	108	Prop. Champs. Whf.
Germany,	337 cs.	Becker & Ulrich

Paraffin Wax—

U. S.,	127 brls.	H. Hill & Sons
"	500	"
"	220	G. H. Frank

Pyrites—

La Jaja,	400 t.	Forbes, Abbott, & Co.
"	500	G. Ward & Sons
"	440	T. S. Whitehead & Chambers

Saltpetre—

Germany,	100 cks.	T. Merry & Son
Belgium,	135 bgs.	G. Meyer & Co.
E. Indies,	1,639	Clift, Nicholson, & Co.
Germany,	27 cks.	P. Hecker & Co.
"	2	Craven & Co.
"	79	J. Hall & Son

Stearine—

France,	60 bgs.	H Hill & Sons
U. S.,	20 hds.	Beresford & Co.
Holland,	13 bgs. 13 sks.	Perkins & Homer

Sugar of Lead—

Germany,	19 pks.	Petri Bros.
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Tartars—

Italy,	183 pks.	Seagar, White, & Co.
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Tartaric Acid—

Holland,	100 pks.	N. Smith
"	50	B. & F. Wf. Co.
Germany,	44	O. Andrea & Co.
Holland,	16	B. & F. Wf. Co.

Ultramarine—

Holland,	12 pks.	Becker & Ulrich
"	26 cs.	G. Steinhoff
Germany,	14 pks.	"
"	8	Blundell, Spence, & Co.
Belgium,	11	Hernu, Peron, & Co.

Zinc Oxide—

Germany,	9 cks.	H. Lambert
Holland,	500	Soundy & Son
"	40	M. Ashby
"	200	"

LIVERPOOL.

Week ending April 10th.

Acids (otherwise undescribed)

Leghorn,	30 cks.	Shropshire Union Co.
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Barytes—

Antwerp,	26 cks.	"
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Bones—

Boston,	6 tcs.	"
Natal,	20 t.	H. Burk & Co.
Karachi,	4,941 bgs.	W. & R. Graham & Co.

Smyrna,

Colon,	57 t.	O. Gantes & Co.
"	382 bgs.	A. Dobell & Co.

Bone Meal—

Boston,	20 brls.	"
Karachi,	49 bgs.	W. & R. Graham & Co.

Caoutchouc—

Maranham,	3 bxs.	H. Evans
Colon,	19 bls.	J. M. Williams
Para,	2 cs.	A. Christiansen
"	119	"
"	17 4 sms.	A. Booth & Co.
Lisbon,	341 bgs.	"
New York,	75	"

Cream of Tartar—

Patras,	8 brls.	C. Raftopulo & Co.
Tarragona,	5 cks.	"

Carbolic Acid—

Havre,	39 bls.	"
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Chemicals (otherwise undescribed)

Rotterdam,	24 cks.	"
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Dried Blood—

Monte Video,	226 bgs.	J. Purdon
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Dyestuffs—

Extracts		
Boston,	25 brls.	L. Levinstein & Sons
"	411 cks.	"
Rouen,		"
Baltimore,	50	Boute her
Fiume,	139	Mortimer, & Co.
"	121	Milled Tanning
Colon,	50 cs.	E. Chesney & Co.
Fustic		
Colon,	246 ps.	A. Dobell & Co.
"	1,581	"
Cochineal		
Las Palmas,	4 bgs.	J. Goddard & Co.
"	6	Swanston & Co.
Orchella		
Lisbon,	12 bgs.	Leeds & Liverpool Canal Co.
Indigo		
Calcutta,	45 cs.	1 bx. Margan & Co.
"	73	Baring Bros.
"	45	"

Divi Divi

Hamburg,	100 bgs.	"
"	204	"
Amsterdam,	100	"

Alizarine

Rotterdam,	4 brls.	"
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Valonia

Patras,	447 bgs.	Papayanni & Jeremias
"		S. Vinxenti & Son
Smyrna,	50 t.	"
"	450 bgs.	"
Argols		
Naples,	4 cks.	"
Brindisi,	313 sks.	27 brls.

Glucose—

Hamburg,	50 cks.	"
Stettin,	24	Bostock & Co.
"	200 bgs.	"

Glycerine—

Amsterdam,	5 crbys.	3 cs.
Rotterdam,	5	"
Marseilles,	6 dms.	Francis & Co.

Isinglass—

Para,	12 cs.	Hooton & Yates
"	21	Bieber & Co.
Maranham,	2 cks.	Gunston, Son, & Co.
"	1	Schill, Modera, & Co.

Manganese—

Coquimbo,	1,000 t.	"
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Nitrate—

Pisagua,	2 389 bgs.	Hainsworth, Watson, & Co.
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Paraffin Wax—

Baltimore,	100 brls.	"
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Pitch—

Hamburg,	15 bgs.	"
Amsterdam,	13 cks.	"
Rotterdam,	45	"

Potassium Prussiate—

Rotterdam,	4 cks.	"
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Picric Acid—

Rotterdam,	2 cks.	"
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Phosphate of Lime—

Dunkirk,	4,200 bgs.	"
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Pyrites—

Huelva,	2,713 t.	Matheson & Co.
"	1,613	"
"	1,504	Beauford & Co.
"	1,183	Matheson & Co.

Stearine—

Boston,

Phosphate—
Trepport, 2,863 sks.
Salt—
Hamburg, 101 t.
" 508 bgs.
Saltpetre—
Hamburg, 48 cks. J. Poynter & Co.
Tartar—
Bordeaux, 31 cks.
Tartaric Acid—
Rotterdam, 4 cks.
Zinc Oxide—
Antwerp, 50 cks.

HULL.

Week ending April 10th.

Acid (otherwise undescribed)
Amsterdam, 30 cks. W. & C. L. Ringrose
Borax—
Boston, 1 brl. Wilson, Sons, & Co.
Barytes—
Antwerp, 200 bgs. H. F. Pursey
Bremen, 22 cks. Tudor & Sons
Bone Meal—
Bombay, 770 bgs.
Chemicals (otherwise undescribed)
Rotterdam, 12 cks. G. Lawson & Sons
Dunkirk, 150 34 pks. Wilson, Sons, & Co.
Antwerp, 14 " "
Hamburg, 25 " "
Rotterdam, 2 " G. Lawson & Sons
" 12 cks. "
" 51 pks. W. & C. L. Ringrose
Bremen, 3 pgs. Veltmann & Co.
" 2 cks. Wilson, Sons, & Co.
Dyestuffs—
Myrabolams
Bombay, 9,466 bgs.

Madder
Rotterdam, 1 ck. G. Lawson & Sons
Amsterdam, 2 cks. W. & C. L. Ringrose
Rennet
Copenhagen, 33 cks. Wilson, Sons, & Co.
Rotterdam, 9
Alizarine
Rotterdam, 4 pks. W. & C. L. Ringrose
" 45 Hutchinson & Son
" 2 cks. W. & C. L. Ringrose
Extracts
Rouen, 60 cks. 170 cs. Rawson & Robinson
Boston, 50 brls.
New York, 4 Wilson, Sons, & Co.
Glucose—
Hamburg, 21 cks. Wilson, Sons, & Co.
" 10 Rawson & Robinson
" 22 Bailey & Leetham
" 13
Stettin, 200 bgs. 5 cks. Wilson, Sons, & Co.
" 100 21
Hamburg, 13
New York, 40 brls. Wilson, Sons, & Co.
Manure—
Dunkirk, 200 bgs. Wilson, Sons, & Co.
Rouen, 11 cks. Rawson & Robinson
Naphthol—
Rotterdam, 10 pks. Wilson, Sons, & Co.
Stearine—
Rotterdam, 15 bgs. Wilson, Sons, & Co.
Soda—
Rotterdam, 3 cks. G. Lawson & Sons
Salt—
Hamburg, 203 bgs. Furley & Co.
Tar—
Dunkirk, 3 pks. Wilson, Sons, & Co.
Libau, 40 brls.

TYNE.

Week ending Apr. 10th.

Barytes—
Antwerp, 21 cks. Tyne S. S. Co.
Rotterdam, 24 " "
Copper Precipitate—
Huelva, 7,297 bgs. Scott Bros.
Glycerine—
Rotterdam, 5 pks. Tyne S. S. Co.
Pyrites—
Huelva, 400 t. A Guthrie
" 1,099 Scott Bros.
Phosphate—
Antwerp, 280 t. Langdale's Manure Co.
" 440 1,000 bgs. "
Salt—
Hamburg, 100 t
Saltpetre—
Hamburg, 278 t.
" 204
Sodium Nitrate—
Iquique, 12,550 bgs. J. C. Swan
Sulphur Ore—
Pomaron, 1,200 t. Mason & Barry
Zinc Oxide—
Antwerp, 25 brls. Tyne S. S. Co.

GOOLE.

Week ending April 2nd.

Antimony Ore—
Boulogne, 8 cks.
Caoutchouc—
Boulogne, 16 cks.
Dyestuffs—
Alizarine
Rotterdam, 57 cks.
Madder
Rotterdam, 15 cks.
Dyestuffs (otherwise undescribed)
Boulogne, 4 cks. 86 cks. 4 pks.

Glucose—
Hamburg, 250 bgs. 1 ck.
" 90
Manure—
Phosphate Rock
Ghent, 800 bgs.
Naphthalaniline—
Rotterdam, 1 ck.
Naphthol—
Rotterdam, 3 cks.
Potash—
Dunkirk, 61 drms.
Calais, 192
Phosphate—
Ghent, 800 bgs.
Soda—
Rotterdam, 7 cks.
Sodium Silicate—
Rotterdam, 2 cks
Saltpetre—
Rotterdam, 285 bgs.
Salt—
Hamburg, 1,016 bgs.

GRIMSBY.

Week ending Apr. 5th.

Caoutchouc—
Hamburg, 2 pks.
Chemicals (otherwise undescribed)
Hamburg, 31 cs. 6 pks.
Dyestuffs—
Extract
Dieppe, 18 cks.
Dyestuffs (otherwise undescribed)
Antwerp, 6 cs.
Glucose—
Hamburg, 17 cks.
Zinc Ashes—
Antwerp, 23 cs.
" 9 cks.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending April 5th.

Ammonium Carbonate—
Libau, 34 kgs. 32 cks. £178
Reval, 7 t. 10 c. 215
Ammonia—
Gothenburg, 10 c. £18
Arsenic—
Rangoon, 1 t. 5 c. £17
Ammonium Sulphate—
Colombo, 2 t. 17 c. £38
Carbolic Solid—
Hamburg, 4 t. 19 c. £405
Copper Sulphate—
Salonica, 1 t. 2 c. £25
Canterbury, 1 30
Caustic Potash—
Otago, 1 t. 18 c. £40
Citric Acid—
Halifax, 5 c. £35
New York, 2 t. 10 36
Copenhagen, 5 kgs. 35
Hamburg, 1 t. 10 c. 10 kgs. 268
Stettin, 1 7
Coal Products—
Naphthalene
Hamburg, 89 cks. £175
" 6 cs. 12
Benzol
Hamburg, 1 drm. £15
Anthracene
Dusseldorf, 88 cks. £475
Tar
Karachi, 100 rults. £52
Calcutta, 204 173
Pitch
Boston, 200 cks. £127
Antwerp, 340 t. 470
Chemicals (otherwise undescribed)
Melbourne, 15 kgs. £105
Auckland, 41 pks. 20
Bahia, 13 36
Infectants—
Colombo, 2 t. 10 c. £37

Manure—
Hamburg, 29 t. 11 c. £100
" 175 15 703
Nakelkow, 450 t. 2,070
Auckland, 60 192
Gothenburg, 243 t. 12 c. 1,236
Hamburg, 68 6 273
Auckland, 45 607
Potassium Chlorate—
Sydney, 5 t. £211
Sulphur—
Calcutta, 19 t. 19 c. £100
Sydney, 100 375
Sodium Tartrate—
Toronto, 1 ck. £21
Superphosphate—
Malmo, 25 t. £300
Soda Crystals—
N. Orleans, 26 t. 5 c. £100
Canterbury, 4 18 16
Soda Ash—
Auckland, 10 t. £65
Saltpetre—
Adelaide, 1 t. £21
Halifax, 1 12 c. 33
Tartaric Acid—
Adelaide, 1 t. £133
Calcutta, 300 lbs. 21
Toronto, 5 cks. 130
Canterbury, 5 c. 40
Auckland, 5 40

LIVERPOOL

Week ending April 9th.

Ammonia—
Valparaiso, 4 c. £7
Ammonium Sulphate—
Antwerp, 50 t. £625
Valencia, 50 600
Antimony Regulat—
Algiers, 1 t. 19 c. 1 q. £131
Bordeaux, 7 11 1 505

Ammonium Carbonate—
Oporto, 10 c. 1 q. £17
Portland, 1 t. 33
Ceara, 3 3 9
Genoa, 1 7 44
Stockholm, 7 8
Christiania, 7 3 8
Alum—
Callao, 4 t. 9 c. £24
Galatz, 1 16 9
Ibrail, 9 2 46
Ancona, 4 3 22
Portland, 3 15 18
Bilbao, 5 25
Santos, 19 5
Syra, 4 3 22
Valparaiso, 1 10 1 q. 7
Ammonium Muriate—
New York, 10 t. 9 c. £250
Antwerp, 6 3 q. 9
Philadelphia, 16 2 3 389
Brimstone—
Calcutta, 8 t. 3 q. £38
Boston, 25 106
Borax—
Monte Video, 1 t. 12 c. £47
Christiania, 3 16 115
Vera Cruz, 1 1 3 q. 33
Havana, 5 2 8
Boracic Acid—
Stockholm, 10 cks. £141
Bone Waste—
Rouen, 2 t. 15 c. £23
Barbadoes, 30 214
Bleaching Powder—
Barcelona, 20 brls.
Boston, 184 cks.
Genoa, 27
Gothenburg, 4
Naples, 54
Philadelphia, 59
Rouen, 15
Trieste, 29
Boston, 537 10 cs. 168 tcs.
Hamburg, 28
Philadelphia, 122
Rotterdam, 8
Rouen, 59

Caustic Soda—
Seville, 100 drms.
Ancona, 10
Barcelona, 211 25 brls. 25 cks.
Bilbao, 180 17 15
Catania, 24
Corunna, 24
Genoa, 47
Gothenburg, 3
Hamburg, 18
Lisbon, 225
Naples, 5
New York, 395
Portland, 200
Rio Grande du Sol, 66 drms.
Rouen, 40
Santos, 20
Alcantara, 80
Ancona, 20
Antwerp, 13
Bahia, 21
Barcelona, 178
Boston, 725
Naples, 30
New York, 877
Pasages, 100
Ponce, 4
Portland, 100
Rouen, 30
Santos, 15
Ibrail, 35
Carbolic Acid—
Rotterdam, 24 t. 5 c. £20
Hamburg, 19 7
Havre, 19 3
Mayaguez, 16
Portland, 16
Paris, 2 19 1 q.
Cobalt Oxide—
Gijon, 1 c.
Charcoal—
Hamburg, 37 t. 13 c.
Havre, 17 16
Citric Acid—
Barcelona, 1 t. 1 c. 3 q.
Copper Sulphate—
Genoa, 5 t. 1 c.
" 54 4

Leghorn,	9	17	3 q.	225
Marseilles,	202	8	3	4,217
Leghorn,	5	3		120
Nantes,	29	18	3	679
Alexandria,	1	2		23
Pasages,	9	18	2	253
Bilbao,	5	1		90
Bordeaux,	4	19	1	125
St. Nazaire,	5	3	1	145
San Sebastian,	10			220
Barcelona,	35			850
Tarragona,	1	2	3	19
Trieste,	4	19	1	22
Venice,	15	8	3	455
Pasages,	21	5		285
San Sebastian,	27	16		443
Syria,	8	2		695
Trieste,	4	10	2	11
Valencia,	8	19	2	110
Bordeaux,	5	1	1	180
Havre,	5			110
Rouen,	40	12		120
Vera Cruz,	10	2	5 cks.	1,013
Pasages,	10	1	3	233
Bilbao,	10	1	3	232
Genoa,	6			106
Bordeaux,	5	5	1	6
Barcelona,	4	18	1	107
Tarragona,	5	1	2	112
Copperas—				110
Piræus,	8 t.	18 c.	2 q.	
Galatz,	4			£20
Alexandria,	24	15		9
Cream of Tartar—				27
Savanna,	5 c.	1 q.		£28
St. John's, N. F.,	1 t.	11	3	159
Caustic Potash—				
St. John's, N. F.,	3 c.			£6
Hamburg,	7			8
San Francisco,	10			12
New York,	14			16
Chemicals (otherwise undescribed)				
New York,	1 t.	10 c.		£77
Chalk Precipitate—				
Philadelphia,	1 t.	19 c.		£27
Chloride of Lime—				
New York,	50 t.			£280
Epsom Salts—				
Rio Janeiro,	50 kgs.			
Rouen,	6 cks.			
Gypsum—				
Canada,	5 t.	10 c.		£23
Iron Oxide—				
Gijon,	1 t.	4 c.	2 q.	£7
Iodine—				
New York,	8 t.			£4,800
Leather Waste—				
Havre,	1 t.	4 c.		£9
Manure—				
Antwerp,	14 t.	12 c.		£66
Magnesia—				
Antwerp,	2 cs.			
Genoa,	1			
Naphthaline—				
Antwerp,	202 t.	6 c.		£161
Potassium Carbonate—				
Philadelphia,	6 c.			£10
Boston,	13 t.			168
Potassium Chromate—				
Havre,	2 t.			£70
Phosphorus—				
Shanghai,	8 c.			£48
Monte Video,	10 cs.			165
Buenos Ayres,	10			165
Potassium Chlorate—				
Corunna,	10 c.			£23
New York,	5 t.			200
Stockholm,	4			168
Yokohama,	5			216
Genoa,	1			47
Bari,	10			20
Phosphate—				
Hamburg,	10 t.	9 c.		£55
Potassium Silicate—				
Amsterdam,	1 t.	2 c.	3 q.	£10
Potassium Bichromate—				
Marseilles,	1 t.	7 c.	2 q.	£61
Pitch—				
Ancona,	2,208 t.			
Brindisi,	1,715			
Sodium Silicate—				
Algoa Bay,	10 cks.			
Cartagena,	8			
Lisbon,	8			
Odessa,	100			
Oporto,	8			
Barcelona,	10			
Bilbao,	16			

Sodium Bicarbonate—				
Amapala,	20 kgs.			
Antwerp,	60	8 cks.		
Bombay,	250			
Calcutta,	500			
Hamburg,	80	4		
Ibrail,	60			
Marseilles,	50			
Rotterdam,	50			
Santander,	20			
Valparaiso,	100			
Antwerp,	12 pks.	42 cks.		
Barcelona,	300 kgs.			
Bari,	60			
Bordeaux,	100			
Genoa,	100			
Hamburg,	309			
Leghorn,	70			
New York,	200			
Rotterdam,	10			
Rouen,	260	25		
St. John's,	100			
Salonica,	20			
Santander,	20			
Ancona,	82			
Superphosphate—				
Gr. Canary,	5 t.			£18
Saltsake—				
Philadelphia,	37 t.	18 c.		£81
Boston,	100			213
Saltpetre—				
Piræus,	1 t.	7 c.	1 q.	£30
Portland,	3	7	3	75
Syria,	3	2	2	69
Sulphur—				
Rotterdam,	2 t.	18 c.	3 q.	£20
Boston,	49	19		210
Portland,	5	18	3	37
Rouen,	20			90
Sydney,	3	1		29
Pernambuco,	8	2		10
Calcutta,	15			90
Madras,	3	16	1	24
Boston,	50	2		220
Salmoniac—				
Genoa,	2 t.	4 c.	3 q.	£72
Naples,	9			17
New York,	5			170
Bari,	10			5
Piræus,	2	3		18
Genoa,	10	2		181
Philadelphia,	5	3	1	36
Marseilles,	1	2		75
Mersyne,	1	2	3	14
Sodium Biorate—				
Stettin,	10 t.	3 c.	2 q.	£306
Stockholm,	10	3	2	306
Antwerp,	26	2		781
Ibrail,	6	2		10
Sodium Sulphate—				
Philadelphia,	13 t.	6 c.		£69
Rio de Janeiro,	1	14	1 q.	6
B. Ayres,	2	4	3	18
Soda Ash—				
Baltimore,	119 cks.			
Barcelona,	10			
Boston,	373	214 bgs.	262 tcs.	
Cadia,	6			
Kingsley,			16	
Montreal,			41	
New York,			1,311	
Philadelphia,	142		231	
Syria,	30			
Valparaiso,		10 brls.		
Baltimore,	65		288	
Barcelona,		100 brls.		
Beyrout,	50			
New York,			968	
Patras,	20			
Philadelphia,	309			
Soda Crystals—				
New York,	140 cks.			
Philadelphia,	140			
New York,	140			
Salt—				
Barbadoes,	18 t.			
Cameroon,	49			
Chicago,	195			
Old Calabar,	100			
Portland,	160			
Santos,		20 cs.		
Algoa Bay,	6 t.			
Bonny,	10			
Brass,	50			
B. Ayres,	482			
Cape Lopez,	25			
Cape Town,	11			
E. London,	10	6 c.		
Gr. Bassam,	9	18		
Halifax,	599	13		
Lagos,	100			
Penang,	1	16		
Rouen,	10			
Sierra Leone,	50			

Tartaric Acid—				
Savanna,	1 c.	1 q.		£9
Tar—				
Cabenda,	9 brls.			
St. John's,	50			
Zinc Chloride—				
Bombay,	2 t.	12 c.		£44

TYNE.

Week ending April 10th.

Alkali—				
Stettin,	2 t.	12 c.		
Rotterdam,	10			
Antwerp,	18	11		
Antimony—				
Rotterdam,	5 t.			
Barytes Carbonate—				
Hamburg,	5 t.	5 c.		
Stettin,	4	15		
Bleaching Powder—				
Antwerp,	103 t.	14 c.		
Brake,	1	8		
Hamburg,	169	7		
Christiania,	1	12		
Odense,	10	17		
Hamburg,	22	4		
Riga,	40	4		
Stettin,	215	4		
Gothenburg,	4	16		
Konigsberg,	91	11		
Rotterdam,	33			
Copperas—				
Christiania,	9 t.			
Caustic Soda—				
Gothenburg,	25 t.	17 c.		
Antwerp,	149	9		
Brake,	7			
Rotterdam,	1	4		
Litharge—				
Antwerp,	11 c.			
Hamburg,	5 t.			
Christiania,	1	7		
Riga,	1	8		
Stettin,	4	2		
Manure—				
Christiania,	25 t.			
Esbjerg,	31	8 c.		
Magnesia—				
Antwerp,		3 q.		
Hamburg,	14 c.			
Oxalic Acid—				
Odense,	3 t.	4 c.		
Sodium Hyposulphite—				
Antwerp,	5 t.	4 c.		
Sodium Bicarbonate—				
Brake,	10 c.			
Soda—				
Kallundborg,	6 t.	5 c.		
Aalborg,	27	7		
Odense,	9	13		
Randers,	39	7		
Aarhuus,	14	4		
Grenaa,	15	1		
Rotterdam,	28	10		
Soda Ash—				
Brake,	10 c.			
Dunkirk,	7 t.	4		
Gothenburg,	11	18		
Stettin,	1	19		
Gothenburg,	9			
Konigsberg,	80	3		
Sodium Chlorate—				
Hamburg,	6 t.			

HULL.

Week ending April 8th.

Alkali—				
Bremen,	2 cks.			
Copenhagen,	10			
Drontheim,	17 drums.			
Bleaching Powder—				
Drontheim,	1 ck.			
Chemicals (otherwise undescribed)				
Amsterdam,	5 cks.			
Bordeaux,		20 cs.		
Bergen,	23			
Boston,	50			
Copenhagen,		17 pks.		
Christiania,	8	7		
Drontheim,	72			
Danzig,	42			
Ghent,	4			

Gothenburg,	7	5 cs.	10	318 sh
Hamburg,	22	128	6	
Hango,	1			
Konigsberg,	26			
Libau,	22			
Melbourne,		2		
New York,		2		
Riga,				
Rotterdam,	26		30	26 cks.
Reval,		2		
Rouen,	30			
Stockholm,	7	3		
Caustic Soda—				
Danzig,	35 drums.			
Konigsberg,	21			
Libau,	75			
Dyestuffs (otherwise undescribed)				
Antwerp,	2 cks.			
Beston,	5			
Hamburg,		102 c.		
Hango,		5 pks.		
Rotterdam,	1	11 kgs.	5 cs.	
Manure—				
Aalborg,	208 t.			
Dunkirk,		672 bgs.		
Gothenburg,	50			
Hamburg,	111			
Pitch—				
Antwerp,	230 t.			
Tar—				
Danzig,	18 cks.			
Gothenburg,	150			
Hamburg,	12			
Konigsberg,	6			

GLASGOW.

Week ending April 10th.

Chloride of Tin—				
Japan,	8½ c.			£1
Dyestuffs—				
Logwood,				
Halifax,	88½ c.			£11
Magnesium Silicate—				
Penang,	2 t.	18½ c.		£1
Manure—				
Mauritius,	70 t.	9½ c.		£7
"	105			8
Magnesium Chloride—				
Penang,	2 t.	11½ c.		£2
Paraffin Wax—				
Rouen,	14 t.	17½ c.		£4
Japan,	135¾			17
Potassium Bichromate—				
Boston,	332 c.			£6
Amsterdam,	13 cks.			11
Barcelona,	331½ c.	18 lbs.		£6
Rotterdam,	65 cks.			4
Pitch—				
Caen,	720 t.			
Sodium Bichromate—				
Halifax,	2 t.	17½ c.		£1
Boston,	355			45
Rouen,	16	9½		41
Soda Ash—				
Baltimore,	605½ c.			£21

GOOLE.

Week ending April 2nd.

PRICES CURRENT.

WEDNESDAY, APRIL 16, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
25 % and 40 % per cwt	7/6	&	12/9
Glacial			67/6
S.G., 2000°	0	12	9
82 % nett per lb.	0	0	6½
.. .. .	0	0	3¼
.. .. .	0	0	8
.. .. . (Tower Salts), 30° Tw.			0 2 11
.. .. . (Cylinder), 30° Tw.			0 0 2
.. .. . 30° Tw.			0 0 1¼
.. .. .			0 0 4
.. .. .			0 1 2½
.. .. .			15 10 0
ic (fuming 50 %) per ton			10 0 0
.. .. . (monohydrate)			3 2 6
.. .. . (Pyrites, 168°)			1 8 0
.. .. . (150°)			1 10 0
.. .. . (free from arsenic, 140/145°)			2 15 0
ous (solution)			0 1 0½
.. .. . (pure) per lb.			0 1 2½
.. .. .			13 0 0
.. .. . white powdered per ton			4 15 0
.. .. . (lump)			5 0 0
.. .. . sulphate (pure)			4 10 0
.. .. . (medium qualities)			0 15 0
.. .. .			0 0 3
.. .. . 880=28° per lb.			0 0 1¼
.. .. . =24°			0 0 3½
Carbonate nett			23 0 0
Muriate per ton			37/- & 35/-
.. .. . (sal-ammoniac) 1st & 2nd			40 0 0
Nitrate per ton			0 0 10½
Phosphate per lb.			11 10 0
Sulphate (grey), London			12 7 6
.. .. . (grey), Hull			0 0 11
.. .. . (pure) per lb.			0 0 9
.. .. .			0 0 9
.. .. .			0 0 9
.. .. . (tartar emetic) per lb.			0 1 1
.. .. . (golden sulphide)			0 0 10
.. .. . chloride per ton			8 0 0
.. .. . carbonate (native)			3 15 0
.. .. . sulphate (native levigated)			45/- to 75/-
.. .. . Powder, 35 %			5 0 0
.. .. . Liquor, 7 %			2 10 0
.. .. . of Carbon			13 0 0
.. .. . Acetate (crystal) per lb.			0 0 6
.. .. . chloride per ton			2 2 6
.. .. . (at Runcorn) in bulk			17/6 to 35/-
Dyes:—			
.. .. . (artificial) 20 % per lb.			0 0 9
.. .. .			0 0 3 9
Products			
.. .. . ene, 30 % A, f.o.b. London per unit per cwt.			0 1 5
.. .. . 90 % nominal per gallon			0 3 4
.. .. . 50/90			0 2 7½
.. .. . Acid (crystallised 35°) per lb.			0 0 9¼
.. .. . (crude 60°) per gallon			0 2 4
.. .. . (ordinary)			0 0 2½
.. .. . (filtered for Lucigen light)			0 0 3
.. .. . naphtha 30 % @ 120° C.			0 1 3
.. .. . Oils, 22° Tw. per ton			3 0 0
.. .. . a.b. Liverpool or Garston			1 8 0
.. .. . Naphtha, 90 % at 160° per gallon			0 1 9
.. .. . Oils (crude)			0 0 2½
.. .. . (Sili Bars) per ton			48 7 6
.. .. . phosphate			25 0 0
.. .. . de (copper scales)			51 0 0
.. .. . (crude)			30 0 0
.. .. . distilled S.G. 1250°			55 0 0
.. .. .			8½ d. to 9d.
.. .. . ate (copperas) per ton			1 10 0
.. .. . ide (antimony slag)			2 0 0
.. .. . t) for cash			14 0 0
.. .. . arge Flake (ex ship)			15 10 0
.. .. . ate (white)			23 10 0
.. .. . (brown)			18 5 0
.. .. . onate (white lead) pure			19 0 0
.. .. . ate			22 0 0

Lime, Acetate (brown)	£	s.	d.
.. .. . (grey) per ton	7	17	6
Magnesium (ribbon and wire) per oz.	0	2	3
.. .. . Chloride (ex ship) per ton	2	5	0
.. .. . Carbonate per cwt.	1	17	6
.. .. . Hydrate	0	10	0
.. .. . Sulphate (Epsom Salts) per ton	3	0	0
Manganese, Sulphate	18	0	0
.. .. . Borate (1st and 2nd) per cwt.	60/-	&	42/6
.. .. . Ore, 70 % per ton	4	10	0
Methylated Spirit, 61° O.P. per gallon	0	2	2
Naphtha (Wood), Solvent	0	3	10
.. .. . Miscible, 60° O.P.	0	4	6
Oils:—			
Cotton-seed per ton	22	10	0
Linseed	24	10	0
Lubricating, Scotch, 890°—895°	7	5	0
Petroleum, Russian per gallon	0	0	5¼
.. .. . American	0	0	5¼
Potassium (metal) per oz.	0	3	10
.. .. . Bichromate per lb.	0	0	4
.. .. . Carbonate, 90% (ex ship) per ton	19	0	0
.. .. . Chlorate per lb.	0	0	5
.. .. . Cyanide, 98 %	0	2	0
.. .. . Hydrate (Caustic Potash) 80/85 % per ton	22	10	0
.. .. . (Caustic Potash) 75/80 %	21	10	0
.. .. . (Caustic Potash) 70/75 %	20	15	0
.. .. . Nitrate (refined) per cwt.	1	2	6
.. .. . Permanganate	4	2	6
.. .. . Prussiate Yellow per lb.	0	0	9½
.. .. . Sulphate, 90 % per ton	9	10	0
.. .. . Muriate, 80 %	7	15	0
Silver (metal) per oz.	0	3	7½
.. .. . Nitrate	0	2	5¼
Sodium (metal) per lb.	0	4	0
.. .. . Carb. (refined Soda-ash) 48 % per ton	6	5	0
.. .. . (Caustic Soda-ash) 48 %	5	5	0
.. .. . (Carb. Soda-ash) 48 %	5	12	6
.. .. . (Carb. Soda-ash) 58 %	6	15	0
.. .. . (Soda Crystals)	2	17	6
.. .. . Acetate (ex-ship)	15	15	0
.. .. . Arseniate, 45 %	11	0	0
.. .. . Chlorate per lb.	0	0	6¼
.. .. . Borate (Borax) nett, per ton	29	0	0
.. .. . Bichromate per lb.	0	0	3
.. .. . Hydrate (77 % Caustic Soda) per ton	12	15	0
.. .. . (74 % Caustic Soda)	11	10	0
.. .. . (70 % Caustic Soda)	9	17	6
.. .. . (60 % Caustic Soda, white)	8	15	0
.. .. . (60 % Caustic Soda, cream)	8	12	6
.. .. . Bicarbonate	6	0	0
.. .. . Hyposulphite	5	10	0
.. .. . Manganate, 25 %	9	0	0
.. .. . Nitrate (95 % ex-ship Liverpool) per cwt.	0	8	0
.. .. . Nitrite, 98 % per ton	28	0	0
.. .. . Phosphate	15	15	0
.. .. . Prussiate per lb.	0	0	7¼
.. .. . Silicate (glass) per ton	5	7	6
.. .. . (liquid, 100° Tw.)	3	17	6
.. .. . Stannate, 40 % per cwt.	2	0	0
.. .. . Sulphate (Salt-cake) per ton	1	5	0
.. .. . (Glauber's Salts)	1	10	0
.. .. . Sulphide	7	15	0
.. .. . Sulphite	5	5	0
Strontium Hydrate, 98 %	8	0	0
Sulphocyanide Ammonium, 95 % per lb.	0	0	8
.. .. . Barium, 95 %	0	0	5¼
.. .. . Potassium	0	0	8
Sulphur (Flowers) per ton	7	15	0
.. .. . (Roil Brimstone)	6	0	0
.. .. . Brimstone: Best Quality	4	5	0
Superphosphate of Lime (26 %)	2	10	0
Tallow	25	10	0
Tin (English Ingots)	93	0	0
.. .. . Crystals per lb.	0	0	6¼
Zinc (Spelter) per ton	20	10	0
.. .. . Chloride (solution, 96° Tw.	6	0	0

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As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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THE COPPER MARKET.

A REVIEW OF THE PRESENT POSITION.

WHEN the operations of what will probably for a long time to come be known as the Copper Syndicate, came to such a disastrous end in the beginning of 1889, the most gloomy apprehensions were rife as to the future of the Copper Market. As the huge combination was seen to be tottering to its fall, and vainly struggling, like a fly in a spider's web, to free itself from the toils that enveloped it, the attention of almost every thinking individual was drawn to the subject, and hundreds of thousands of people who had previously associated the metal only with pence and half pence, were then made aware for the first time of the importance of the role that copper plays in the economy of the world. The general opinion was that when the inevitable crash came, the stock that had for sixteen months been increasing with a fatal rapidity, would so flood the market that for years to come its organisation would be gone, and every man's hand would be against that of his neighbour's in his eagerness to sell. Then the crash came, and for a short time the fears of the pessimists seemed to be only too well founded. A fortnight saw G.M.B.S. fall from £77. 15s. to £35. and the holders of stocks were ruined. But gradually the state of things improved, and the position to-day shews that if the speculators of 1887 and 1888 had been content to raise Chili bars to say £55., the Syndicate might still have been in existence and have realised considerable profits. Of course the collapse of the combination removed the great incentive to production, while at the same time consumption received a tremendous stimulus. Copper returned to the place that nature appears to have indicated for it in the arts and manufactures, and the search for substitutes ceased to be remunerative. How prices gradually improved to the neighbourhood of £50. is now a matter of history, and it reflects no small credit on those to whom fell the manipulation of the huge stocks left by the Syndicate, that these prices have been fairly well maintained up to the present. It is not difficult to account for the state of affairs that has made the task of the holders a much easier one than seemed probable some twelve months since. That period has seen an immense activity in most of the industries where copper plays a part. In the single field of electricity its use has increased by leaps and bounds, and the number of works lately erected, or now in course of erection, for the manufacture of sulphate of copper, testifies to the growing consumption of that article. In addition to this, it must be remembered that the stock of old copper, which proved such an awkward factor in the calculations of M. Secretan and his colleagues, has been pretty well exhausted, and that many mines which were only called into a state of production by the abnormal prices of 1887-8, have been relegated to obscurity. On duly weighing these considerations it is easy to see why the total stocks in English and French warehouses have fallen from 118,500 tons to 87,770 within the last twelve months, or a total decrease of nearly 31,000 tons. But if we take the figures of the last three and a half months—from the 1st of January to the 15th of April—we note that the decrease in stocks is only

s, shewing that the diminution has fallen off considerably in rapidity, and that supply and demand are coming much closer together. Probably this is to be accounted for in two ways. In the first place a lull has come over trade generally, and the copper industries participate in the general lull; and in the second place it must be remembered that the price is still a very remunerative price to mineowners who are able to produce when C.B.S. stood at £40., and the price of cement is certain to operate in favour of an increased demand.

It is one of the signs of the times that Messrs. Messrs. and Barry, Limited, expect to produce twice as much in 1890 as they dealt with in 1889. If only trade is good and absorb the output, we see no reason why the supply should not be maintained for a long time to come, but either of the causes above-mentioned, the supply would exceed the demand, even to a very slight extent, and the effect upon the market would be most noticeable.

THE SPONTANEOUS IGNITION OF COAL CARGOES.

PROFESSOR VIVIAN B. LEWES, ASSOCIATE, F.C.S., F.I.C.

At the Thirty-first Session of the Institution of Naval Architects, held on the 28th, 1890, the Earl of Ravensworth in the chair.]

TEN years ago the loss of life and property caused by the spontaneous ignition of coal cargoes became so serious that the Board of Trade, in unison with the Committee of Lloyds', urged upon the Government the necessity for appointing a Royal Commission to inquire into the possibility of preventing a class of disaster as in nature as it is destructive in result. The Commission, appointed in April, 1875, had the good fortune to be aided in its inquiry by the scientific knowledge of Dr. Percy and Mr., now Sir, Abel, and after collecting and collating all the evidence which could be obtained, they in the following year published their report on the subject. In this report much valuable evidence is given, and much sound advice is given for the guidance of the Board of Trade in the shipment of coals; but whether it is that the blue book scares the ordinary reader, or that the circulation of the report, often of the most valuable character, is of necessity limited, the fact remains that the conditions at present existing are as bad as they were before the publication of the report.

Nine years immediately following the report, viz., 1875 to 1884, nine coal-laden vessels are known to have been lost from spontaneous ignition of their cargoes, whilst during the same period 328 vessels were lost from unknown causes, a large percentage of these losses undoubtedly due to the same cause; and these, again, form but a small percentage of the cases in which cargoes have heated and in which the vessel has been saved; and now, within the last few years, the statement has gained ground that with the general increase of temperature in steamships, due to the introduction of triple expansion engines and high pressure boilers, spontaneous firing in the stowage of coals and coal cargoes, is very much increased, and that many of these circumstances, Mr. Martell suggested to me some time ago in inquiry into the causes and possible prevention of this very evil, would be work, not only likely to be acceptable to the Board of Trade, but also one that was needed in the Service, in the mercantile marine; and I have now much pleasure in before you the results obtained in a long series of experiments, taken in conjunction with the work done by others on the subject, which throws a somewhat clearer light upon the causes of this particular phenomenon, and enables suggestions to be made for its prevention.

A substance of purely vegetable origin, formed out of contact with long exposure to heat and pressure, from the woody fibreous constituents of a monster vegetation which flourished long before the earth was inhabited by man; and coal may therefore be considered as a form of charcoal, which having been formed at a temperature higher than that of the charcoal burner's heap and under great pressure, is very dense, and still retains a quantity of those constituents, the latter case, are driven off, as tar, wood naphtha, &c.; the bodies consist essentially of compounds containing carbon and hydrogen, together with a little oxygen and nitrogen, and form the matter and hydrocarbons of the coal.

In the carbon and hydrocarbons, coal also contains certain bodies which were mostly present in the sap and fibre of the

original vegetation, and which give the ash which is left behind when the coal is burnt.

These substances consist chiefly of sulphate of lime or gypsum, silica and alumina, whilst in nearly all kinds of coal is to be found a substance called disulphide of iron, coal brassy or pyrites, which has been formed by the gradual reduction of the sulphates by carbonaceous matter in the presence of iron salts, and which, during the combustion of the coal, is decomposed, giving off sulphur compounds and leaving behind oxide of iron, which gives the reddish brown colour to the ash left by many kinds of coal.

Of these constituents of coal, the only ones which play no part in the phenomena attending heating and spontaneous ignition, are the mineral constituents other than the pyrites, and we have therefore to deal with the chemical actions which take place when the carbon, hydrocarbons, and brassy matter contained in newly-won coal come in contact with air and moisture.

(a) THE INFLUENCE OF CARBON IN PRODUCING HEATING.

Carbon is one of those substances which possess to an extraordinary degree the power of attracting and condensing gases upon their surface, this power varying with the state of division and density of the particular form of carbon used. The charcoal obtained from dense forms of wood, such as box, exhibit this property to a high degree, one cubic inch of such charcoal absorbing* :-

Ammonia gas	90 cubic inches.
Sulphuretted hydrogen	55 "
Carbon dioxide	35 "
Ethylene (olefiant gas)	35 "
Oxygen	9.25 "
Nitrogen	6.5 "

whilst certain kinds of coal also exhibit the same power, although to a less degree.

The absorptive power of newly-won coal due to this surface attraction varies, but the least absorbent will take up 1/4 times its own volume of oxygen, whilst in some coals more than three times their volume of the gas is absorbed. This absorption is very rapid at first, but gradually decreases, and is, moreover, influenced very much by temperature, for reasons which will be explained later.

The absorption is at first purely mechanical, and itself causes a rise of temperature, which in the case of charcoal formed in closed retorts, as in preparing alder, willow, and logwood charcoal for powder-making, would produce spontaneous ignition, if it were not placed in sealed cooling vessels for some days before exposure to air.

The rate of absorption varies with the amount of surface exposed, and therefore able to take part in this condensing action, so that when coal or charcoal is finely powdered, the exposed surface being much greater, absorption becomes more rapid, and rise of temperature at once takes place. If charcoal is kept for a day after it has been made, out of contact with air, and is then ground down into a powder, it will frequently fire after exposure to the air for thirty-eight hours; whilst a heap of charcoal powder, of 100 bushels or more, will always ignite. It is for this reason that, in making the charcoal for powder, it is always kept, after burning, for three or four days in air-tight cylinders before picking over, and ten days to a fortnight before it is ground.

In the case of coal, this rise in temperature all tends to increase the rate of the action which is going on; but is rarely sufficient to bring about spontaneous ignition, as only about one-third the amount of oxygen being absorbed by coal that is taken up by charcoal, and the action being much slower, tends to prevent the temperature reaching the high ignition point of the coal. Air-dry coal absorbs oxygen more quickly than wet coal.

(b) THE ACTION OF THE BITUMINOUS CONSTITUENTS OF THE COAL IN SPONTANEOUS IGNITION.

All coal contains a certain percentage of hydrogen, which is in combination with some of the carbon, and also with the nitrogen and oxygen, and forms with them the volatile matter in the coal, and the amount present in this condition varies very largely, being very small in anthracite and very great in cannel and shale. When the carbon of the coal absorbs oxygen, the compressed gas becomes very chemically active, and very soon commences to combine with the carbon and hydrogen of the bituminous portions, converting them into carbon dioxide, and water vapour. This chemical activity increases rapidly with rise of temperature, so that the heat generated by the absorption of the oxygen causes it to rapidly enter into chemical combination. Chemical combination of this kind—i.e., oxidation—is always accompanied by evolution of heat, and this further rise of temperature again increases rapidity of oxidation, so that a steady rise of temperature is set up, and this taking place in the centre of a heap of small coal, which, from the air and other gases enclosed in its interstices, is an admirable non-conductor of heat, will often cause such heating of the mass that if air can percolate slowly into the heap in sufficient quantity to supply the necessary percentage of oxygen for

* Saussure.

the continuance of the action, the igniting point of the coal would be soon reached.

The effect of rise of temperature in increasing the rapidity of chemical actions of this kind can be realised from the effect which it has in the spontaneous ignition of oily waste or rag.

If a substance like cotton waste be rendered oily with anything except the mineral oils, it acquires the power of taking up oxygen from the air, and this oxidising the oil gives rise to heat. At ordinary temperatures this oxidation is slow, and, consequently, it may be days before the rise in temperature becomes sensible, but when this point is reached the oxidation proceeds with remarkable rapidity, and in a few hours the point of ignition is reached and the mass bursts into flame, whilst if the oily waste be placed in a warm place at first, spontaneous ignition is only a question of hours or sometimes even minutes.

Galletley found that oily cotton at ordinary temperatures took some days to heat and ignite, whilst placed in a chamber warmed to 130° to 170° F. (54° to 76° C.), the cotton greasy with boiled linseed ignited in one hour fifteen minutes, and olive oil on cotton in five hours, and in a chamber heated to 180° to 200° F. (82° to 93° C.) olive oil on cotton ignited in two hours.

It has been suggested that very bituminous coal, such as cannel, shale, and coals containing schist, is liable to spontaneous ignition from the fact that a rise in temperature would cause heavy oils to exude from them, which, by undergoing oxidation, might cause rapid heating. But experiment not only shows that this is not the case, but that the heavy mineral oils have a remarkable influence in retarding heating cotton waste, oily with easily oxidisable oils mixed with 20 per cent. of heavy mineral oil, being exempt from heating.

(c) THE ACTION OF IRON DISULPHIDE, PYRITES, OR COAL BRASSES IN PROMOTING SPONTANEOUS IGNITION.

Ever since Berzelius first expressed the opinion that the heat given out by the oxidation of iron disulphide into sulphates of iron might have an important bearing on the heating and ignition of coal, it has been adopted as the popular explanation of that phenomenon; and although the work of Dr. Richters clearly proves this not to be the case, the old explanation is still given, a notable exception, however, being in the case of our great metallurgist, Dr. Percy, who, as early as 1864, pointed out that probably oxidation of the coal had also something to do with spontaneous combustion, a prediction amply verified by Dr. Richters' researches some six years later.

This disulphide of iron is found in coal in several different forms, sometimes as a dark powder distributed throughout the mass of the coal, and scarcely to be distinguished from coal itself. In larger quantities it is often found forming thin golden-looking layers in the cleavage of the coal, whilst it sometimes occurs as large masses and veins, often an inch to two inches in thickness, but inasmuch as these masses of pyrites are very heavy, they rarely find their way into the screened coal for shipment, many hundreds of tons of these "brasses" being annually picked out from the coal at the pit's mouth, and utilised in various manufacturing processes. If the air is dry the pyrites undergo but little change at ordinary temperatures; but in moist air they rapidly oxidise when in a finely-divided condition, the first action being the formation of ferrous sulphate and sulphur dioxide, together with the liberation of sulphur, the relative amounts of the two latter being regulated by the temperature and the supply of air, whilst longer contact with moist air converts the ferrous sulphate in a basic ferric sulphate generally termed "misy."

It is during this process of oxidation that the heat supposed to cause the ignition is evolved. But when it is considered that some of the coals most prone to spontaneous combustion contain only eight-tenths of a per cent. of iron pyrites, and rarely more than 1¼ per cent., the absurdity of imagining this to be the only cause of ignition becomes manifest. If 100 lbs. of coal were taken, and the whole of the pyrites in it concentrated in one spot and rapidly oxidised to sulphate, the temperature would barely be raised to 100° C., if all loss of heat could be avoided. Besides which, in certain manufactures pure iron pyrites are largely used, and, when free from carbonaceous matter, may be kept in a state approaching to powder in heaps containing many hundred tons; and although undergoing continual oxidation, I have been unable to trace a single case of heating, much less a rise of temperature which would approach the igniting point of coal. When, however, it is mixed with finely divided carbonaceous matter, then heating and ignition is a frequent occurrence in even moderate sized heaps.

I have carefully determined the igniting point of various kinds of coal, and find, that—

Cannel coal	ignites at 698 degrees F.	= 370 degrees C.
Hartlepool coal	" 766 "	= 408 "
Lignite	" 842 "	= 450 "
Welsh steam coal	" 870.5 "	= 477 "

So that no stretch of imagination could endow the small trace of pyrites scattered through a large mass of coal, and undergoing slow oxidation, with the power of reaching the needful temperature.

Dr. Richters fully realises this point, and discards the idea of the

pyrites doing anything more than adding their mite to the cause which bring about rise of temperature. In this, however, I think he is mistaken, my experiments, which will be published when complete, pointing to the fact that they may increase the liability to ignition when present in large quantities, and do so liberating sulphur under certain conditions. Now, sulphur has an igniting point of 482 F. or 250 C., so that the presence of free sulphur would lower the ignition point of the coal by considerably over 100 degrees Centigrade, the sulphur in the case playing exactly the same part that it does in gunpowder, which it lowers the point of ignition, and increases the rapidity of combustion. A still more important part played by the pyrites is that as they become oxidised to ferrous sulphate they swell in size, and tend to split up the coal into small pieces, and by exposing a large extent of fresh surface to the air cause increase of temperature and energetic chemical action.

We can now trace the actions which cumulate in ignition. The newly-won coal is brought to the mouth of the pit, and at once commences by virtue of its surface action to absorb oxygen from the air but unless piled in unusually large heaps, and a good deal broken, does not, as a rule, show signs of heating, as the exposed surface comparatively small, and the air finding its way freely between the lumps keeps down the temperature. The coal is now screened, and the obtrusively large lumps of brasses picked out; it is then put in the trucks and enjoys the disintegrating processes of jolting and shunting innumerable, every jar adding to the percentage of small coal present and a corresponding increase in the size of the surface exposed to the air. Arrived at the docks it has to be transferred from the truck to the ship, which is done by one of the numerous forms of tips, shoots, spouts employed for the purpose, and it is during this operation the more harm is done than at any other period. The coal first shot in the vessel by reason of the distance which it has to fall is broken down in small lumps, and having to bear the impact of the succeeding load falling upon it from a height, rapidly becomes powdered into slack, whilst the succeeding loads falling in on the cone so formed get more or less broken down, so that by the time the cargo is all taken in, a dense mass of small coal is to be found under the hatchway, and it is invariably this point that heating takes place, as the large surface exposed fresh to the air by the breaking down of the coal causes rapid absorption of oxygen, and consequent rise of temperature. This sets up chemical combination between the oxygen absorbed by the coal and the hydrocarbons and the coal brasses.

The combination of the brasses with oxygen causes the swelling of the oxidised mass and splitting up of the coal; fresh surfaces are exposed, and more absorption of oxygen takes place, and the igniting point of the sulphur vapour and sulphur compounds distilled out of the pyrites is reached, and rapidly raises the temperature to the igniting point of the coal. It is only in cases where large quantities of dense coal brasses are present that this action can take place, as in the ordinary case, where 1 or 2 per cent. only of pyrites are present, the sulphur vapour distilled out from the pyrites is oxidised to sulphur dioxide at temperatures far below the point of ignition of sulphur vapour; and in such cases the heat of absorption and oxidation of the bituminous portions of the coal is amply sufficient to raise the temperature to the requisite 752° to 932° Fahr. (400° to 500° C.)

(To be continued.)

THE THARSIS SULPHUR AND COPPER COMPANY

ON Friday last the ordinary general meeting of the Tharsis Sulphur and Copper Company was held in Glasgow. Sir Charles Tennant Bart., who presided, moved the adoption of the report. He said the total output of refined copper for 1889 had exceeded that of 1888 2,256 tons, and, owing to the pressing wants of the trade, they were enabled to invoice their sales very closely up. They had written £20,000. off the mines (which now stood at £280,000.), £20,000. off the railways and pier, £98,950. off works, buildings, machinery, and plant account in Spain, and £6,411. off the works in Britain. As to the Société des Metaux, the amount of their claim at the date of the 31 December last was £263,915., which they had carried to a suspense account. This amount would of course be largely increased by the end of the current year, at which date their three years' contract would expire. What might be the result of the legal proceedings they had instituted, and which were now pending, it was difficult to say. They were hopeful of being allowed to rank as creditors for the total amount of their claim, in which case they should probably, or, it was perhaps safer to say they might, receive some dividend. The total sum remaining at the credit of profit and loss account was £249,169, which enabled the directors to pay a dividend of 20 per cent. and to carry forward £14,237. 1s. 6d. to the credit of 1890. With reference to the prospects of the company for the current year, the Chairman said their sales of pyrites were the same as last year's, both as to quantity and price. The whole of their production of iron ore had been placed at slightly higher prices. The report was adopted.

REGULATION OF THE SALE OF FERTILIZERS IN GERMANY.

the liberal government which France has chosen for, it has been thought necessary to enact special laws regulation of manures.

Germany the State has not yet turned its attention to, and it is through the private action of the individuals—both buyers and sellers—that proposals have been made regulation of transactions in fertilizing materials. This thesis is sufficiently striking to give interest to some of the resolutions adopted by a committee composed of and agriculturists.

United States, in France, and in Belgium, says the *Landwirthschaftliche Presse*, from which we borrow these buses have given rise to legislation against the delinquents. any, where there is just as much to complain of, it is be thought necessary to protect those who are the victims, ished to effect this without having recourse to State.

It would be grand, worthy of the German spirit, chultz, to attain the end desired by a common effort, by the private action of manufacturers, merchants, agricultural and representatives of science, associated together with putting the trade in fertilizing materials on a secure oughout Germany. To succeed in such a movement, and independent of the public authorities, this would be a r for the industry and trade in fertilizing materials for identic men in particular, for the Society of Agriculture, ver, adds he, for the German nation, and for the lofty spirit which animates it.

Enthusiastic appeal of M. Schultz has not fallen unheeded upon . The section dealing with the subject at the Magdeburg appointed a special committee upon it, consisting of nine three representing agriculture, three the manufacturing and three the agricultural stations. Meeting at Berlin on the er last, under the presidency of Dr. Maercker, the eminent t Hallé, this committee has decided upon the following lations:—

Essary that all sacks containing commercial fertilizers offered ould bear upon them in printed characters the exact designa-manufacturer, the name of the fertilizer, and the amount of valuable substances contained in it. It is also desirable ks should always be of uniform weight, which might be 75, or 100 kilos.; the sacks should be completely filled.

ds the name and composition of the fertilizer, the sub-com-arrived at the following conclusions:—

Use of *superphosphate*, without any qualification, the amount hosphoric acid should not be indicated.

ie superphosphate contains phosphoric acid partly soluble in partly insoluble, the value of which must therefore be ex-e quantity of each of these two forms of phosphoric acid e stated on the sack.

precipitate should bear a statement of the total phosphoric hose of *finely powdered Thomas slag*, both of phosphoric ie dust.

bone meal, fish guano, meat dust, Peru guano, wool dust, to be labelled with their contents of phosphoric acid and of

acal superphosphate, obtained from superphosphate and mium sulphate should tell the amount of soluble phosphoric nitrogen.

Use of mixtures of *nitrogenous substances with superphos-superphosphate*, associated with organic nitrogenous matter ther, dust, wool, &c.), the amount of total nitrogen, and rely the proportion of organic matter to ammoniacal ould be stated.

superphosphates, mixtures of superphosphates with Chili ould be marked with the amounts of nitrogen and soluble acid.

of *nitrate of soda, sulphate of ammonia, and superphosphate* labelled with their percentage of phosphoric acid, soluble in te, and ammoniacal nitrogen.

oad, bone and other nitrogenous manures should have their percentage of nitrogen indicated. In all mixtures of potash should be stated the percentage of potash together with that valuable substances present. It would be well to arrange ns concerned to give the percentage of potash in kainite and salts instead of, as at present, the amount of sulphate of ained in them.

iling should take place immediately upon receipt of the should be done in the presence of an agent of the seller or ial and competent person.

ommittee of the 15th October, has decided to put these o practice until the autumn of 1890. It has also expressed

a desire to see a uniform method of examining manures adopted, and has given it to be understood that a conference of delegates from the experimental stations, with representatives of the manufacturers, would not only contribute towards this result, but also clear up the different questions raised on this subject.

Such are the commercial regulations which the German Society of Agriculture has just adopted, with the hope of ensuring integrity in the manure trade and thus rendering it more active. Small dealers will be the first to profit by them; small farmers, so often exposed to fraud against which they are unable to defend themselves, will regain confidence, and an excellent effect will shortly be produced on the progress of agriculture.

NEW DYES.

A series of chameleon colours, including red, purple, pink, brown, scarlet, maroon, orange, and yellow.

(MANCHESTER ANILINE COMPANY).

For 100lbs. Cotton (Yarn or Cloth).

1ST BATH.—Dissolve in 4 gallons of boiling water 5lbs. chameleon, 20lbs. common salt, and pour the solution into the dye-bath containing about 200 gallons water. Enter the cotton at boiling point, boil for 30 minutes, give several turns, lift and wash. (The bath can be renewed to its original strength by the addition of 2½lbs. chameleon.)

2ND BATH—cold—1lb. of nitrite of soda, 2lbs. sulphuric acid, 168° Tw. Turn continually for 15 minutes, take out, rinse in cold water, and enter at once into the

3RD BATH OR DEVELOPING BATH, which is made up, according to the colour required, as described below:—

Work the cotton in this bath cold for 30 minutes. Lift out, wash and dry, and the dyeing is completed.

RED.—Dissolve 1¼lbs. red developer with equal weight of liquid caustic soda, 150° Tw., in 2 gallons of hot water.

SCARLET AND ORANGE.—These developers are dissolved in the same proportions as for red.

PINK.—Dissolve 1lb. developer in cold water with sufficient soda crystals to neutralise the bath. To brighten the shade, wash in boiling water, then in hot soap, and again in boiling water. Wring and dry. In dyeing this colour proportionately less quantities of chameleon, nitrate of soda, and sulphuric acid are required than for the red.

MAROON.—Dissolve 15 to 20lbs. developer in hot water and neutralise with soda ash.

PURPLES.—Dissolve 1¼lbs. developer in hot water and proceed as for red.

YELLOW AND BROWN.—10lbs. of each of these developers are required for medium shades. With the brown a little hydrochloric acid should be used.

MEM.—The first and third bath can be kept for further use, but the second bath must be made up afresh every day. The dyeing processes must be carried through in quick succession.

DIAMINE BLACK R o (Leopold Cassella and Co.).—The great value of this dye is for mixing purposes. It can be combined with any other substantive dyes, especially our diamine colours, viz.: Diamine red N O, diamine yellow, diamine blue B and 3 R, cotton brown A and N, and thioflavine S, in any required proportions, thus producing almost any shade on cotton in one bath and at a very small cost.

COTTON.—Dye boiling, adding 2 oz. of crystallised Glaubers' salt per gallon of water to the dye-bath; common salt, soda, potash, phosphate of soda, borax, or soap may likewise be used. By topping with brilliant green in a cold bath without any further addition a dead black can be obtained, diamine black acting as a mordant for basic dye-stuffs, such as brilliant green, solid green, safranine, magenta, and thioflavine T. Dyeings done with diamine black R o are extremely fast to washing and light. Acid renders the shade bluer and brighter.

SILK.—Dye with addition of some acetic acid.

SILK AND COTTON (mixed) FABRICS dye like pure cotton. By using soap in the place of Glaubers' salt, the cotton takes up the dye-stuffs, the silk remaining undyed.

WOOL AND COTTON (mixed) FABRICS can be dyed in one bath by addition of Glaubers' salt, using diamine black R o for the cotton and our naphthylamine black D pat. for the wool in such proportions as the fabric contains more or less of the two materials. If the dyeing is done in copper or tin vessels care must be taken that the bath does not turn alkaline, owing to the simultaneous use of naphthylamine black D.

PRINTING AND DISCHARGING.—Zinc dust will discharge diamine black R o. For calico-printing, special directions are issued.

THE GLOBE CHEMICAL WORKS, WIDNES.—G. H. Scott and Co., of New Mills, near Stockport, have taken over the above for the manufacture of India-rubber chemicals—chloride of sulphur, disulphide of carbon, and golden sulphuret of antimony, etc. They are reconstructing the premises, and almost entirely renewing the plant.

THE ECONOMICS OF ILLUMINATING AGENTS.

THE question as to the actual cost to the consumer, everything being included, of the light produced by the various illuminating agents now in use has not yet received a clear and definite answer. Careful attention should therefore be paid to any evidence which is based upon a serious study of the question, so that at least some idea of the truth may be gained. It is for this reason that we reproduce below extracts and tables, taken from a paper presented by M. C. Rolland, engineer at Mons, to the Society of Engineers of the Liege Institute, and published in the *Revue Universelle des Mines*.

According to this author, "it follows from the examination of these tables that lighting by gas, and even by petroleum, is by no means on the point of being replaced by the electric light." These tables establish the fact that under the most favourable conditions for the production of the electric light, that is to say, where spare motive power can be applied to its production, this system of lighting still costs 0.0016 francs per candle power per hour (Table VII.), while gas, costing 0.15 francs per cubic metre, burnt in the recuperative lamps of Siemens, or still better, of Wenham, gives a light which only costs 0.001011 francs, and even only 0.000698 francs per candle power per hour. (Table II.)

PETROLEUM.

The luminous intensity given by a petroleum lamp varies considerably with the quality of the oil employed, and also with the quality, the state of cleanliness, and the cut of the wick. A badly-trimmed wick, or one not cut level, gives, for example, a flame which on one side is too long, and slightly yellow or brown, because the supply of air at that point is insufficient, and on the other side is perhaps too small, the air supply being there in excess. Now, it is well known that under both of these conditions the illuminating power suffers.

The management and regulation of wicks is delicate work, and certainly ought to be included in an estimate of the expense of a lamp.

Another source of expense in using this class of illuminant is that arising from the use of the lamp—repairs, consumption of wicks and chimneys, losses of oil, and waste used for cleaning (column 6 of Table I.).

It may be estimated that these sources of expense amount per lamp and hour to—

Expense of lamp.....	0.0100 franc.
Wicks, chimneys, &c.....	0.0045 „
	0.0145 franc.

Finally, to include the additional trouble connected with the use of this illuminant, such as purchasing the oil, storing oil, risk of fire, etc., we think that the theoretical price ought to be increased by 25 per cent. It will be observed that the luminous intensity diminishes considerably when the photometric measurement is made at an angle of 45°.

According to the experiments of M. Heim, the loss of illuminating power is proportional to the diameter of the burner. It is 20 per cent. for burners with an ordinary long flame; about 35 per cent. for the 30 mm. burners used in lamps which give an intense round flame, and amounts to 5 per cent. with 60 mm. burners. It will be possible to compare the luminous intensities of the various systems of lamps and burners at this angle of 45°. The one class giving the maximum intensity at 0° (horizontal rays), the other at 90° (vertical rays).

Moreover, lamps are usually employed under such conditions that their rays are at this angle.

ILLUMINATING GAS.

Column 7 of Table II. gives the expenses of putting down apparatus and mains for candle power per hour, calculated on the following grounds:—

In Belgium the cost of establishing a public burner may be estimated at 15 francs (for private illumination, stations, rooms, etc., where more elegant appliances are used, the cost may rise to 25 or 35 francs per burner), and maintenance and interest may be taken at 10 per cent. of this amount, say 150 francs per annum. This cost must be spread over the entire consumption, depending on the number of hours during which it is in use.

Assuming a minimum of 700 hours per annum, and a consumption of 250 litres per hour, it will be found that at 15 centimes per cubic metre, interest and maintenance must be valued at about 6 per cent. of the value of the gas.

The corresponding expenses for a regenerative Siemens or Wenham lamp, which costs at least 60 francs for a consumption of 250 litres per hour, may be calculated in the following manner, a saving of 50 % of gas being supposed:—

2 ordinary burners	value 3 fr.
2 secondary tubes	4 fr.
Piping and main tube (30 fr., less 7 fr.)	23 fr.
	30 fr.

II.

One complete regenerative burner, giving the same light as the two burners above	60 fr.
Piping and principal tube	23 fr.
Secondary tube	2 fr.
	85 fr.

The expense x per cent. of maintenance and interest is then found by the following proportion:—

$$30 : 6 :: 85 : x$$

$$x = \frac{6 \times 85}{30} = 17 \%$$

We have, therefore, calculated at this rate the expenses tabulated in column 7, table II. for the illumination given by Siemens and Wenham lamps.

For Clamond and Aver burners we have adopted 10 % of the gas consumed as representing the corresponding expenses. The rate of 6 % remains for ordinary burners, the cost of which does not exceed 1 francs.

It must be borne in mind that these numbers should vary inversely with the number of hours during which the burners are employed since the sources of expense remain almost constant whatever be the consumption of gas.

Before passing to the examination of some other modes of illumination, a word may be said on the subjects of recuperation and intense burners.

The luminous intensity of a flame increases very rapidly with its temperature, and may be approximately represented by an expression of the form $I = a^t$, when I is the intensity of the flame, and t its temperature. The great increase of intensity obtained by superheating the air may thus be conceived, when it becomes sufficient to sensibly increase the temperature of the flame and so produce a more efficacious combustion. In the Siemens and Wenham lamps the air may be heated to 400° or 600°, but the apparatus soon wears out if the latter temperature be habitually employed.

To render the recuperation rational and efficacious it is essential that the apparatus be so arranged that the air is heated by the products of combustion, and not simply by the flame of the burner, for this can only give up part of its heat at the expense of its illuminating power.

It has not been found advantageous to strongly heat the gas itself, on the contrary, deposits are thus formed which rapidly block up the orifices by which it escapes from the burner.

For a given consumption of gas there is a definite supply of air which corresponds to a maximum of luminous intensity. The determination of this quantity is of special importance when ordinary burners with cold air are employed, but even when hot air is supplied it is still important to ascertain exactly the draught which corresponds to a maximum of illuminating power.

Everyone can convince himself of the effect of the draught on volume of air brought into contact with luminous flame on its illuminating power by simply placing a glass chimney on the top of the glass of an Argand burner, so that the height of the chimney is doubled. It will be observed that the flame immediately becomes lower and throws a less powerful light on surrounding objects, although it may itself become whiter. Inversely, the intensity of a flame, which is burning with an excess of air, may be increased by diminishing the supply of the latter. This increase continues until the flame becomes brown towards the top, after which further diminution of the air supply causes a rapid diminution in the brightness of the flame, the combustion then becoming incomplete.

This experiment justifies the conclusion that for burners with cold air the maximum of light corresponds to the minimum of air which permits of complete combustion, and that the yellow flame is more economical than a white flame obtained by means of an excess of cold air.

When the air arrives at the burner heated to 500°, the influence of the draught will, of course, not be so great, but it must be remembered that the temperature of the flame expressed in degrees is twice as great as this.

The economy effected by these intense flames, that is to say, flame produced by a large amount of gas, may be explained by the facts that in the first place, the amount of air immediately surrounding the flame is smaller for an equal volume of flame than in the ordinary burner and that the loss of heat is thus also rendered smaller; and that in the second place the surfaces and volumes of neighbouring parts of the apparatus so situated as to be capable of absorbing heat from the flame are also smaller in proportion to the gas consumed; finally, a wide flame consists of an interior cone of gas, surrounded by a thicker incandescent layer (which must be traversed by the air) than is the case in a narrow flame burning the same volume of gas.

On account of these various circumstances the temperature of a large flame is appreciably higher than that of a small one, and hence arises its greater illuminating power. This luminous intensity, therefore, results from a more effective combustion, which produces an increase in the light radiated from the flame.

TABLE I.—PETROLEUM.

	Chief Types of Lamp.		Actual Ex- pense, 25° in excess of calculated.		Chief Types of Lamp.		Actual Ex- pense, 25° in excess of calculated.
	Angle with Horizon, 0°.	Angle 45°.			Angle with Horizon, 0°.	Angle 45°.	
Candle power	40	29.3		Working expenses per candle per hour.....	0°	0°00049	0°00049
Consumption of petroleum of best quality, 800 grammes per litre ..	99gr.	90		Total expenses per candle per hour	0°001058	0°00120	
Consumption per candle power per hour	2.25	3.037	3.796	Total expenses per lamp per hour, 29 candle power at 45°	0°0313	0°03545	
Expense per candle per hour, at 0°15 francs. per litre		0°000508	0°000710				

TABLE II.—ILLUMINATING GAS.

Type of burner.	Angle with horizon.	Candle power	Gas per hour in cubic metres.	Consumption of gas per candle power per hour in litres.	Value at 0°15 francs per cubic metre.	Working expenses.	Total per candle power per hour.
Split burner	0 degs.	16.9	0.251	14.8			
	45 "	17.2	0.250	14.9	0°002235 francs	0°000134	0°002369
Argand burner	45 "	21.9	0.239	10.9			
	45 "	19.4	0.241	12.4	0°001860	0°000111	0°001971
New Clamond burner	45 "	21.1	0.190	9	0°00135	0°00013	0°001480
Aver or de Pintsch burner ..	0 "	14.4	1.0951	6.60			
	45 "	10.5	0.1037	9.88	0°001482	0°000148	0°001630
Cardinal or de Brauer burner.	45 "	21.9	0.219	10	0°00150	0°000095	0°00159
Siemens regenerator.....	0 "	65.3	0.460	7.05			
No. 3	45 "	46.9	0.456	9.75	0°001462	0°000248	0°001710
	0 "	28.4	0.249	8.77			
Wenham, No. 2	45 "	44.5	0.257	5.77	0°000864	0°000147	0°001011
	90 "	45.8	0.256	5.58			
	0 "	99.0	0.285	6.92			
	25 "	152.0	0.686	4.51			
Wenham, No. 4	45 "	170.0	0.677	3.98	0°000597	0°000101	0°000698
	65 "	200.0	0.685	3.42			
	90 "	202.0	0.671	3.33			

TABLE III.—WATER GAS.
Photometric tests of Some's burner.

Consumption per hour.		Pressure at the burner.		Candle power.	Candle power per cubic foot.
Cubic feet.	Litres.	Inches.	Mm.		
9.66 ..	272.4 ..	2.25 ..	57.15 ..	12.85 ..	1.33
8.31 ..	234.3 ..	2.37 ..	60.19 ..	10.88 ..	1.31
7.90 ..	222.7 ..	2.50 ..	63.50 ..	12.24 ..	1.55
6.70 ..	188.9 ..	1.75 ..	44.45 ..	8.48 ..	1.26
6.70 ..	188.9 ..	1.00 ..	25.40 ..	8.41 ..	1.25
5.58 ..	157.3 ..	3.25 ..	82.55 ..	9.94 ..	1.78
5.10 ..	143.8 ..	4.50 ..	38.10 ..	6.85 ..	1.34
3.96 ..	111.6 ..	2.00 ..	50.80 ..	5.47 ..	1.38

53.91	1519.9	75.14
Consumption per candle power per hour		20.20 litres.
Price of gas at Frankfurt per cubic metre.....		0.075 francs.
Cost per candle power per hour		0.0015 „
Working expenses, 10 %		0.00015 „
Total cost per candle power per hour.....		0.00165 „

TABLE IV.—MAGNESIUM LAMPS.

No. of ribbons	Without reflector.					Total cost per candle Magnesium at 37½s. per kilo.
	Illuminating power.		Candle power per ribbon.	Consumption per hour per ribbon.	Consumption per hour per candle.	
	With reflector.	Without reflector.				
1	150	3,200	150	16.7 grms.	0.1114 grms.	0.0044
2	237	5,880	118.7	16.7	0.1410	
4	450	8,000	112.5	16.7	0.1480	
6	700	11,300	117	16.7	0.1415	
8	950	17,000	117	16.7	0.1430	

TABLE V.—ELECTRIC LIGHT—ARC LAMPS.

	(M. HEIM.)		Piette Krizich (Schu- ckert) Differential Lamp.		Siemens and Halske Differen- tial Lamp.	
	Circuit lamp of Pieper.					
Diameter of Car- bons	6.7mm.	5.0 ..	1.0 ..		14 ..	
Length of Arc ..	2 "	2 ..	4 ..	4 ..		4.5
Angle with hori- zon	0° ..	45° ..	0° ..	45° ..	0° ..	45°
Candle power ..	126 ..	377 ..	220 ..	1,420 ..	575 ..	3,830
Electric work in volts ampires	160 ..	153 ..	414 ..	410 ..	918 ..	912
Volts ampires per candle power ..	1.27 ..	0°405 ..	1.88 ..	0°291 ..	1.60 ..	0°238
Candle power per horse power ..	433 ..	1,360 ..	293 ..	1,890 ..	344 ..	2,310

TABLE VI.—INCANDESCENT LAMPS.
(After Heim.)

Types.	Candle power.	Electric work in volts ampire.	Volts Ampires per candle.	Candle per H. P.	Lamp per H. P.
Edison lamp, old model	16	72	4.50	122	7.5
" new "	16	60	3.75	147	9.2
Swan lamp, old "	16	66	4.13	133	8.3
" new "	16	56	3.50	157	9.8
Siemens and Halske	16	52	3.25	169	10.6
Bustien (Cannstadt)	16	56	3.50	157	9.8

TABLE VII.—INCANDESCENT LAMPS.

Kind of Installation.	Price per candle power per hour.
Private installation for 200 lamps at least, with special motive power.....	0°0031 fr.
When a part of the labour is on hand and an excess of power can be utilised for the production of the light	0°0016 fr.
Special installation for private lighting ..	0°0047 —0°0062 fr.

SOLUBILITY OF GLASS IN WATER.—(1) Water-glass is decomposed by water into free alkali and silicic acid, a certain proportion (varying with the time of action, concentration, and temperature) of the latter becoming hydrated and dissolved. (2) Potash-glasses are far less soluble than soda-glasses, but the difference decreases with increase of the proportion of lime present. (3) Soda and potash are united in glass both to the silica and the lime. The resistance of glass towards the action of water is dependent on the presence of double silicates of soda or potash and lime. (4) Of all sorts of glass, the plumbiferous flint-glasses are least soluble in boiling water. (5) The relative resistance of glasses is different towards hot and cold water.—*Mylius and Foerster.*

DYNAMITE EXPLOSION.—An explosion occurred at Nobel's Dynamite Works, Stevenston, at one o'clock on the 17th of April, in the refuse acid sheds, doing considerable damage to property and slightly injuring one man. It appears that the refuse-acid had been run into the apparatus in which it was treated, and that the men had ceased to draw off acid from the still, when an explosion occurred in the pipe which brings the acid to the still from the outside tank. The explosion was a severe one, the pipe being torn to atoms, about 50 panes of glass in the roof being broken, some slates torn off, and one of the doors blown out. The man in charge was severely cut about the face, but after being treated at the works he was able to walk home. The cause of the accident is supposed to have been the presence of nitro-glycerine in the acid pipe. The refuse-acid is the acid which remains after manufacture of nitro-glycerine. It is taken to the acid shed to be treated, and it sometimes contains a little of the explosive.—*Times.*

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

THE extra meeting on April 21st, was held as usual at the Chemical Society's rooms, at Burlington House, Mr. David Howard in the chair. After the minutes of the last meeting had been read and confirmed, the secretary, Mr. Tyrer, read a paper by Dr. Moritz and Professor Meldola, entitled, "Note on the expulsion of ammoniacal compounds from sulphuric acid used in Kjeldahl determinations."

The authors have conducted a series of experiments on the process advanced by Professor Meldola some time back, and reported in the Journal of the Society (1884, p. 63), based on the use of a nitrite which was adversely criticised by Lunge, on the ground that the nitrite added was not completely eliminated. These show that, provided heating be continued for at least two hours, and the temperature attained be high, no such danger exists.

In the discussion which followed it was pointed out that acid of the necessary purity could now be bought, and that, therefore, the need of any process of purification was less marked than formerly. Mr. Foster, commenting on the general applicability of the Kjeldahl process, stated that it had failed in his hands when used for gas coke and petroleum, even when Nordhausen acid was employed. Mr. Blount remarked that the attainment of a high temperature could be insured, thus securing the expulsion of nitrous acid and favouring the complete decomposition of the substance analysed, by the addition of potassium sulphate, a device due to Mr. Chattaway. After a few words from Mr. Tyrer, thanking the Section for the consideration shown him as secretary, and introducing his successor, Mr. Mumford, Mr. Boverton Redwood read his paper on "The petroleum fields of India," which he had substituted for the joint paper by himself and Professor Dewar on the conversion of heavy hydrocarbons with illuminating oils, on account of the latter being not quite completed. The oil bearing districts of India are four in number, petroleum being found in Burmah, Assam, the Punjab, and Beloochistan. In Lower Burmah wells exist in the Aracan Islands and on the mainland at Myangung. The industry is ancient, but has been of small importance, chiefly from the crude native methods in use. The oil is light in colour, and some samples yield as much as 66 per cent. of kerosene. Mention of petroleum in Upper Burmah is found in the diary of Captain Cox, dated 1797, in which he compares it with the product then recently obtained by Lord Dundonald by the distillation of coal. In a report of the Indian Geological Survey, a return is made of the wells in the two oil fields of Twingoung and Berne, in Upper Burmah, according to which there are at the former 166 worthless wells, 89 giving a comparatively small quantity, and 120 having a good yield. In these wells the most primitive methods were in vogue, the digging being done by hand, in spite of the high temperature, the impossibility of using a light on account of the inflammability of the oil vapour, and the asphyxiating effect on the workmen, which limited the shifts to 290 seconds as a maximum. To economise time the digger was blindfolded before descending, so that he might begin work at once, and not need to wait until his eyes were accustomed to the feeble light. Messrs. Findlay, Fleming, and Co. have imported transatlantic drillers, properly equipped, and though obtaining at present only about 3-15 barrels of oil per well per day, are confident of securing a larger output. Many difficulties have to be encountered, one of the most serious being scarcity of water, but this has been met by laying a pipe line from the river. With regard to the quality and composition of these oils, wide variations occur, but two distinct kinds can be traced. As a type of the first may be taken an oil with a sp. gr. of '937, flashing point 150° F., solidifying point below 0° F., and of high viscosity; while the second is represented by one with a sp. gr. of '887, flashing point 110° F., solidifying point 82° F., and of low viscosity. The quantity of burning oil that can be obtained by distillation of the crude oil is small, and it has been with a view to increase this to even 70-80 per cent. that Professor Dewar and the author have been working. As may be supposed from its solidifying point, the second oil mentioned above yields much paraffin, most of which is exported, the hot climate of Burmah rendering stearin candles preferable to those made of it.

The oil fields in Assam are mentioned in an official report as early as 1825; and in 1865 the Indian Geological Survey reported that drillings were then being begun. A well 275 ft. deep has been sunk at Digboi and at first yielded well, but the oil struck appeared to be only a pocket and soon ceased. A district some 60 miles square may be reckoned as oil-bearing. From a sample examined 89 % of lubricating oil was obtained, but no kerosene. In the Punjab, Nobel has begun exploiting the district known to contain oil, and thinks well of the enterprise. At the Khatan oil field, in Beloochistan, petroleum containing a good deal of asphaltum in solution is obtained, which has proved good and economical as fuel for locomotives.

In the discussion which followed, Mr. Charles Marvin, who has done much to direct public attention to these petroleum deposits,

pointed out the political and commercial importance of their use as locomotive fuel. Mr. Watson Smith inquired whether coal found in Burmah was anthracite, like that in Pennsylvania, situated near the oil wells. Mr. J. B. White stated that samples of oil examined in England had often been collected from surface pits, and thus having lost their more volatile constituents by evaporation, gave a small percentage of kerosene than if taken direct from a flowing well with regard to Mr. Watson Smith's question, the coal found was not anthracite but a bituminous coal much like that from South Wales collieries. Mr. Boverton Redwood did not think that a parallel could be drawn between the occurrence of coal and oil together in Burmah and Pennsylvania, as their geological position differed materially. At the conclusion of the paper, which was excellently illustrated by specimens, diagrams, photographs, and a map of the district, the meeting was adjourned to May 5th.

NOTES FROM KUHLOW.

TESTING CAST IRON.—In the case of those foundries which obtain their pig directly from blast furnaces the testing of cast iron is especially important, as charcoal blast furnaces are very sensitive to an accidental change in the mixture. The metal, which is taken from the furnace by means of a ladle, the matter floating on the surface being removed, is poured into an open sand mould in the form of a cavity about twenty centimetres in diameter and seven or eight centimetres in depth. Iron which is rich in silicium and carbon becomes rapidly coated on the surface with a dull glowing cover of oxide formation. These dull formations also indicate an iron too rich in graphite. Bright and long-lasting formations distinguish the iron best adapted for casting purposes. If the iron in a little time becomes rapidly blistered, if it throws off hissing sparks, it is a proof that it is poor in silicium and hard. A practised eye will readily perceive the peculiarities in the nature of the iron by carefully observing the formations.

THE WEISSWASSER paper and cellulose manufacturers have just introduced into the market under the names of uni-coloured and two coloured watertight cellulose papers a cellulose material that can be applied to the most varied purposes. The cellulose paper can be used for book backs, table cloths, and as a temporary covering for roofs, well as for packing goods. It can be laid on damp walls and as a coating for maps, in short its applicability is extraordinarily manifold. The cellulose paper is far cheaper than parchment. It does not become sticky through heat, nor does it crack from the cold, as is the case with oil cloth. The disagreeable asphaltic odour is not perceptible.

SPIRIT PRODUCTION IN THE GERMAN EMPIRE.—In the period from the 1st of October, 1889, to the end of March 2, 193,922 hectolitres of pure alcohol were produced in the distilleries in the German Empire, and introduced into free traffic on payment of the consumption imposts, viz., 50 pfgs. on 799,392 hectolitres, and 70 pfgs. on 412,86 hectos.

FLUID MIXTURE FOR TOYS.—Fine ground argillaceous slate 1 per cent., rag paper paste 20 per cent., and 30 per cent. of burnt plaster are mixed with the necessary volume of water to form a paste which is then cast in moulds, the moulds having been previously daubed with finely ground slate, powdered plaster, or fat. A sufficient thick crust will form in a few minutes, when the residuum of the mixture must be poured out of the mould. The mixture, which unbreakable, hardens very rapidly. The castings thus produced may be immersed in paraffin or stearine, or they can be japanned. In the latter case it is desirable, so as not to consume too much paint, to first apply a coat of quick drying boiled oil, and when the oil has become hard the article is to be painted.

NOTE ON MANURE DRYERS.—This being the busy time at many works, says Vincent Edwards, F.C.S., in the *Chemical News*, a few words in connection with the above may be of interest. It is, of course, necessary to add to some manures substances which will not only increase bulk, but at the same time absorb moisture. I have come to the conclusion that there is a good deal of danger of serious error in this matter; in fact, of undoing what has been done at so much expense by adding "dryers" containing iron and alumina; in fact some manufacturers may be deluded by unscrupulous dealers, as it is almost certain that many of these stuffs are worthless. I have made some experiments with ashes from furnaces, and find that some contain large quantities of iron, which, notwithstanding any new ideas to the contrary, is a very dangerous ingredient to supply without discretion to plants. It is true that some may be benefitted by the use of iron as a manure, but the advantages of its general use are more than doubtful. Manufacturers should see that all substances used for dryers are nearly free from iron. No superphosphate or bone manure should contain more than 0.7 per cent. of iron (Fe), which is poison to plants and injury to the manure.

Correspondence.

ANSWERS TO CORRESPONDENTS.

VICTOR.—Soda crystals are often employed in works to make up standard solutions: the "points" as the large crystals are called are always employed, as they do not vary much in composition.

X. J. V. K. Q.—1. 50 per cent. of sulphuric anhydride dissolved in the H_2SO_4 . 2. $140^{\circ}/145^{\circ}$ is the density on Twaddell's hydrometer. Pyrites 165 degs. is pyrites, rectified oil, pyrites 150 degs. is pyrites brown oil. 3. We could not, the labour would be too great. 4. We cannot tell. 5. We note your remarks, and will see what can be done.

W. O. T.—The correct formula is $CaSO_4 \cdot 2H_2O$, and this is the state in which it is found; when burnt, however, it becomes $CaSO_4$, or 126 parts becomes 100. You are correct, it is 21 per cent. nearly.

E. A.—We should like a copy of your paper when it appears.

"OLY BOBS."—We really cannot advise you. There are really so many chemists now in the market that we fear yours is not a solitary case. Your best course is personal application. It was very unwise of you to resign your appointment until you saw at least the shadow of another.

ADVERTISER.—You cannot surely expect one advertisement to do you any good. Has it ever struck you that you have competitors.

BETA.—We forwarded your letter in due course.

MYRABOLANS.—Your query is only suitable for our advertising columns.

PRIZE COMPETITORS.—Your essays have been duly received, but will remain unopened until the time specified in the notice.

MACHINERY.—You can do no better than consult our second-hand machinery columns. (See advt.)

EXHIBITOR.—We accept your apologies for not being present at the opening of the exhibition; we shall be pleased to see you over at any time.

NEMO.—We are sending you an exhibition prospectus.

ALKALI.—Please address the query to us again. We fear your last communication has been mislaid.

C.D.—Thanks for the correction, it has been put right in this issue.

SUGAR MANUFACTURE IN INDIA.

THE new *Kew Bulletin* contains a despatch from the Government of India to Lord Cross respecting sugar manufacture in India. The improvement of sugar production and manufacture in India (the despatch says) has been the subject of attention both of the authorities and of capitalists since the beginning of the century, and various attempts have been made to establish factories, none of which appear to have been attended with any permanent success unless supplemented by the sale of rum and liquors. Sugar refining alone has not proved sufficiently profitable to maintain a factory. Some of the main difficulties against which the industry has to contend are that the cultivation of sugar-cane is limited by the supply, not only of water for irrigation, but also of manure; it is confined to small farms or holdings, and each cultivator who is able to grow the crop at all can only find manure enough for a small area, generally less than half an acre, of sugar-cane. The plots of sugar-cane are, therefore, greatly scattered even in a canal-irrigated tract. A central factory has accordingly to bring in its supplies of cane in small quantities over varying and sometimes considerable distances. The carriage of canes over a long distance is detrimental to the juice for the purpose of sugar making, especially in India, where the canes ripen at the season when the atmosphere is driest, and suffer, therefore, the maximum of injury. The amount of cane which can be grown, limited as it is by the supply of water and manure, barely suffices for the wants of the Indian population. It seems to be at present as profitable to produce coarse sugar for their use as highly refined sugar for export. There is, therefore, no sufficient inducement to capital to embark on the more difficult and expensive system. A further obstacle to sugar refining in India is the high differential rate which the conditions of the excise system require to be placed upon spirits made on the European method as compared with that levied on spirits manufactured by the native process. The sugar refiner in India is thus placed at a disadvantage in respect to the utilisation of his molasses in the form of spirits. Hence the Government is unable to support to project of State model sugar factories, but is inclined to look to the gradual improvement of the ryot's method of manufacture rather than the introduction of more expensive and centralising systems.—*Times*.

ACTION OF SULPHURIC ACID UPON ALUMINIUM.—A. Ditte.—Cold dilute sulphuric acid seems to have no action upon aluminium, yet, as the formation of aluminium hydroxide evolves 195.8 calories, this metal should at ordinary temperatures decompose water and a *smaller* dilute acids. The author in this paper demonstrates that such is not to be attacked, the cause is that it becomes coated with a layer of hydrogen which prevents all direct contact with *plus Rendus*, ex., No. 11.

THE PERMANENT CHEMICAL EXHIBITION.

THE CLAYTON ANILINE COMPANY, LIMITED.—In our notice last week upon this firm's exhibit in the Permanent Chemical Exhibition, we stated that the waste acid from nitro-benzole making contains about 10% of nitric acid; this should have been 1%. We also omitted to mention that Mr. Jas. Robinson, of the firm of Messrs. Broadhurst and Co., was associated with Dr. Dreyfus in the taking out of the patents for the preparation of the purified solvent naphtha by means of which odourless rubber goods can be produced. We understand that a collection of samples of such goods may shortly be seen in the Clayton Aniline Co.'s exhibit.

The proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

RUSSIAN PETROLEUM RETURNS.—According to a report published by the Russian Finance Minister the following were the average daily yields of petroleum during the years mentioned. Tons English by weight:—

	1882.	1883.	1884.	1885.	1886.	1887.	1888.
America ..	26,579	20,451	21,855	18,379	22,838	19,073	15,795
Baku	4,964	5,934	8,845	11,428	11,800	14,889	18,051

The Baku yield for the first ten months of 1889 was greater in total quantity than that of the year 1888.

SULPHATE OF COPPER AND THE VINE CULTURE.—The Phylloxera Commission, speaking with regard to other diseases which have affected the vine, say:—"The mildew, till quite recently so menacing, has vanished. The employment of salts of copper has become general in an unlooked-for manner, and the *vignerons* consent willingly to their application, the more as they note the immediate benefits from it. In fact, in the last two years, wherever the use of salts of copper has been carried on systematically, and at a proper time, the crop has been preserved and the wood has ripened, whilst in the abandoned or neglected vineyards the *vignerons* have seen their crops lost, and the brilliant hopes of the spring destroyed."

Trade Notes.

ALCOHOL FROM CHESTNUTS.—The *Journal de la Chambre de Commerce de Constantinople* says that a company has recently been formed in Paris for the working of products derived from chestnuts, and chiefly the production of alcohol from chestnuts according to improved processes.

A HIGH CHIMNEY.—The Fall River Iron Company's 105 metre high chimney will soon be surpassed in dimensions by one about to be erected in the Imperial foundry at Halsbruch, near Freiburg, Saxony. According to Mr. Huppner's plans it will be 133m. high, with an interior diameter of 4.80m. The pedestal is 12m., the shaft 8.70m., the chimney proper 117.30m., the total length of the flues 98.4m. The structure is to be built on an elevation of the ground 79m. above the workshops, and thus towering over these 217m. The height is intended to neutralise the poisonous effects of the gases.

BRICKS FROM COKE.—The use of coke, coke dust, or graphite from gas-retorts in the manufacture of refractory bricks for lining iron furnaces seems like a contradiction of nature; but it appears from several communications to a recent meeting of the Society of German Iron Manufacturers that an industry in the manufacture of such bricks for ironworks is actually established, and is growing. Hitherto nothing has been found capable of withstanding the corrosive action of blast-furnace slag, which is alternately acid and basic, and carries away the lining of the hearths of the furnaces as though it possessed no resistance, although, as a matter of fact, everything is done to prevent this action. The best refractory materials, if placed in the way of a current of slag, will completely melt away in an hour or two. The observation that slag runs best in a channel of coke or coal ash turned attention to this material for lining furnaces; and Mr. F. Burgess, of Gelsenkirchen, states that in his first experiments, in 1883, he tried a combination of coal, coke dust, graphite, and clay, moulded in the form of bricks. Unfortunately, in the process of burning these carbon bricks, the carbon largely burnt out; but even so they gave satisfactory results. The process could not be patented because it is on record that furnaces in the Hartz Mountains have been lined with a similar combination of coke, dust, and clay. It appears also, from a paper by M. Purcel, that in a certain district of France the hearths and bottoms of furnaces have for some years been lined with graphite brick. The raw material of these bricks was gas-retort graphite, ground and mixed with tar and then calcined. Part of the tar is coked, and binds the graphite into hard and durable bricks. Coke, poor in ash, treated in the same way, yields good results. These bricks give satisfaction in furnaces which are severely pushed. The cost is about £5. per ton in Germany.—*Journal of Gas Lighting.*

Market Reports.

MISCELLANEOUS CHEMICAL MARKET.

Caustic soda has been gradually returning to its normal level of value in relation to soda ash and as the pressure of orders brought about by the recent curtailments of production has now been overcome, the quotations for spot and early deliveries are for 70%, £9. 5s. to £9. 7s. 6d. f.o.b.; and for 60% white, £8. 15s. per ton, and cream, 60%, £8. 12s. 6d. per ton. The higher strengths are obtainable in the Tyne district at £11. 10s. net, for 77%. In Lancashire, 74%, £11. per ton, f.o.b. Soda ash maintains a firm position, and makers are well booked with orders. Prices on the spot 1½d. per degree for ordinary carb ash, 48% to 58%, and for caustic ash, 1¾ per degree. Soda crystals firm at £3. Chlorate of potash quiet, but without change, at 5d. per lb. Sulphur meets with little fresh inquiry, but makers are fairly well engaged for the present output. Bleaching powder quiet and prices for early deliveries, £4. 17s. 6d. to £5. per ton for softwood, on rails. Hardwood casks for export £5 7s. 6d. f.o.b., Liverpool, and £5. 10s. f.o.b., Tyne. Sulphate of copper is still the subject of much speculation as to future prospect. Spot quotations £24. per ton, and for latter part of 1889, £18. 10s. to £19. per ton. Acetates of lime are quiet, but prices steady for prompt and forward deliveries at £7. 17s. 6d. for brown, and £13. 15s. for grey, at usual centres of consumption. Carbolic and picric acids nominally without change, but with a weaker tendency. Lead salts quiet in all grades, but firmly held at current quotations. Green copperas in active demand and prices firmer. White powdered arsenic is moving off freely at £13. per ton, at usual centres of distribution. Aniline oil and salt are firm on the spot and more business doing at the advanced prices. Oxalic acid still scarce, and nominally 4d.; citric and tartaric acids quiet. Chromic acid and bichromates, prussiate of potash, tin and zinc salts, sulphocyanides, and miscellaneous goods for textile trades are extremely quiet in consequence of prevailing dullness of trade.

METAL MARKET REPORT.

	Last week.		This week
Iron.....	46/-	....	44/11
Tin.....	£89 7 6	....	£90 5 0
Copper.....	48 10 0	....	48 7 6
Spelter.....	20 7 6	....	20 15 0
Lead.....	12 10 0	....	12 17 6
Silver.....	45¾d.	....	46d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto.....	16¼ 16¾	....	16¼ 16¾
Mason & Barry....	6¼ 6¾	....	6¼ 6¾
Tharsis.....	4¾ 5	....	4¾ 5
Cape Copper Co. ..	3½ 3¾	....	3½ 3¾
Namaqua.....	1½ 2	....	1½ 2
Copiapu.....	2½ 2½	....	2½ 2½
Panulcillo.....	1½ 1½	....	1½ 1½
New Quebrada....	½ ½	....	½ ½
Libiola.....	2¼ 2½	....	2¼ 2½
Tocopilla.....	1/- 1/6	....	1/- 1/6
Argentella.....	3d. 9d.	....	3d. 9d.

REPORT ON MANURE MATERIAL.

The active business for prompt and early delivery experienced since Easter has been continued during the past week, but prices for phosphatic material still favour buyers, as also do those for nitrogenous material, with the exception of nitrate, which closes somewhat firmer.

Outside shippers of Charleston phosphates, favoured by easier freights, are still inviting offers for cargoes for shipment during the summer months, and buyers have been asked to bid even as low as 10d., though whether business would result at the price seems doubtful. No doubt the prospective shipments of Florida rock will, to some extent, affect the market; and as the present manure season has probably scarcely fulfilled the expectations of manufacturers, they seem at present inclined to defer their purchases for their next season's manures. Prices for other descriptions of rock continue nominally without change, but they are too high to induce United Kingdom buyers to come to terms.

A mixed cargo of River Plate bones and ash—December sailing—has arrived at port of call, and will have to be sold—£5. 7s. 6d. and £4. 17s. 6d. for bones and ash respectively—would probably be business. Further sales of East India crushed bones have been made at Liverpool at £5. 2s. 6d. ex-quay, and some business has been done in meal at £5. 10s., but the quay has now been almost cleared, and buyers do not seem much inclined to purchase afloat so late in the season. Closing values are £5. 2s. 6d. ex-quay for crushed bones, and £5. 10s. ex-quay or store for bone meal. Several parcels of Mediterranean and Brazil bones arrived at Liverpool have been sold at £4. 10s. for sugar stained, up to £4. 17s. 6d. for good clean hard bones, suitable for charring.

There has been a good business passing in nitrate of soda, both or spot and for cargoes, and the market closes firmer. Spot price is 8s. 1½d. Cargoes at coast have been sold at 8s. June and July sailings are worth 8s. 4½d., and for later sailings still higher price are required, very heavy deliveries still continuing; and it being reported that several of the works in Chili have been closed on account of the recent low prices.

There is nothing fresh to report in dried blood, except that small sales of home-prepared have been made at 10s. 6d. per unit, free to rails at works.

Kainit remains as last quoted, 38s. to 40s. in bags, delivered free to rails.

Superphosphates are quiet, but prices remain as last quoted, 46s. 3d. per ton in bulk, delivered free to rails at works.

TAR AND AMMONIA PRODUCTS.

The benzol market is slightly firmer than it was at this time last week; 2s. 7½d. for 50/90's and 3s. 5½d. for 90's are prices which we learn have been actually paid. Solvent naphtha is still in good demand, and especially that quality known as "Odorless solvent." Creosote maintains its price notwithstanding the approach of high evenings, the bulk of it going for creosoting timber, as against the winter use for lighting purposes. Anthracene and carbolic acid remain without change. The pitch market is still depressed, and lower value are mentioned as being very probable.

phate of ammonia market is very dull indeed, prices having since our last report. London is now quoted as £11. 6s. 3d., on at various prices from £11. 7s. 6d. to £11. 5s., with but less doing at these low rates. Hull is spoken of as £11. 6s. downward tendency, while Leith is reported at £11. 5s. ding buyers at this price. We do not believe this drop occasioned by the laws of supply and demand, as at the year we shall probably find there has been as much of ammonia exported as ever.

THE LIVERPOOL COLOUR MARKET.

3.—Unaltered. Ochres: Oxfordshire quoted at £10. 14., and £16.; Derbyshire, 50s. to 55s.; Welsh, to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; 50s. to 55s. White lead, £21. 10s. to £22. Red lead, oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23., red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra est white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto rs', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, ity, £10. to £15. Paris white, 60s. Emerald green, 10d. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

arket has been somewhat easier this week. Manganese: ive somewhat improved; prices firm. Magnesite: Stocks p continue large, and prices are still easier. Raw ground, and calcined ground, £10. to £11. Bauxite (Irish Hill strong demand at full prices—Lump, 20s.; seconds, 16s.; ; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. alk: Arrivals this week have been larger, but the majority nto consumption; prices, therefore, are firm at last figures, for G.G.B. "Angel-White" brand—90s. to 95s. medium, 25s. superfine. Barytes (carbonate) easy; selected crystal e at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good smalls, 50s.; best ground, £6.; and selected crystal ground, hate has somewhat improved, best lump, 35s. 6d.; good os.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; st white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. umicestone quiet; ground at £10., and specially selected st quality, £13. Iron ore unchanged. Bilbao and Santan- 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in nand at 18s. to 24s. Purple ore steady at last quotations. anganiferous ore selling freely at good prices. Emery-stone: ls still continue scarce, especially for spot delivery; prices No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to Fullers' earth steady; 45s. to 50s. for best blue and yellow; able ground, £7. Scheelite; wolfram, tungstate of soda, ten metal inquired for. Chrome metal, 5s. 6d. per lb. alloys 2s. per lb. Chrome ore: More arrivals, but prices Antimony ore and metal have further advanced. Uranium to 26s. Asbestos: Best rock, £17. to £18.; brown grades, 5. Potter's lead ore: Prices are firm; smalls, £14. to cted lump, £16. to £17. Calamine: Best qualities scarce— os. Strontia steady; sulphate (celestine) steady, 16s. 6d. Carbonate (native), £15. to £16.; powdered (manu- £11. to £12. Limespar: English manufactured, old and in demand, and brings full prices; 50s. for ground Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in rm at 22s. to 25s. Plumbago: steady; Spanish, £6.; n lump at last quotations; Italian and Bohemian, £4. to ton; founders, £5. to £6.; Blackwell's "Mineraline," nch sand, in cargoes, continues scarce on spot—20s. l. Ferro-manganese and silicon spiegel in good demand r figures. Chrome iron, 20 per cent., £24. to £25. ca, £50. China clay freely offering—common, 18s. 6d.; um 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

enerally have continued to give way, but even with this in- buyers have not been offering on any scale beyond that of requirements; and their calculation no doubt is that will be easier still within a few days. Consequently, the nimate, except in one or two unimportant sections of the

forward supply department; in these, some contracts of rather im- proved bulk have been carried through. Caustic soda is dropping steadily day by day, and the position of bleach is also less satisfactory, although the tendency to fluctuation here seems not so prominent as it is elsewhere. Last week after report, the Scotch sulphate of ammonia market stiffened under some rather bulky, immediate orders for Glas- gow shipment, and as high as £11. 10s. was got by sellers, thanks to this stimulant; but the pressure is off again, and to-day's price is from £11. 7s. 6d., to £11. 8s. 9d., spot Leith. Forward movement feeble. The paraffin section shows hardly any change, and scale and wax are still healthy, and burning oil still very much otherwise. Lubricating oils firm. One of the Oil Companies has announced results for the year ending March 31st. This is the Clippens Company. It has nothing to divide. The Broxburn Oil Company, it is believed, will again pay 15 per cent. The Tharris Sulphur and Copper Company repeat their 20 per cent. this year, to the surprise of many, as copper has come down. Chief prices current are:—Soda crystals, 51s., net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. net Tyne; caustic soda, white, 76°, £12., 70/72°, £9. 12s. 6d., 60/62° £8. 15s., and cream, 60/62° £8. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6., and 1 cwt. casks, £6. 5s. net Tyne; refined alkali 48/52°, 1¼d., net Tyne; salicake, 28s.; bleaching powder, £5. 7s. 6d. to £5. 12s. 6d., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¼d., less 5% any port; nitrate of soda 8s. to 8s. 1¼d.; sulphate of ammonia, spot, £11. 7s. 6d. to £11. 8s. 9d. f.o.b. Leith; salammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25., less 5% Liver- pool; paraffin scale, hard and soft, 2¼d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 6½d. a gallon; paraffin oil (burning), 6¼d. to 7d. at Glasgow for Scotch consumption only (English orders done at about 1d. a gallon lower); ditto (lubri- cating), 86s°, £5. 10s. to £6. per ton; 88s°, £6. 10s.; and 890/895°, £7. 10s. to £8. Week's imports of sugar at Greenock were 33,859 bags.

THE TYNE CHEMICAL REPORT.

TUESDAY.

After a dull week, the Chemical Market to-day shows signs of more activity and prices are a little firmer. Quotations are still in favour of buyers. Caustic soda has had a further drop of 10s. a ton. Soda crystals are 1s. 6d. per ton less than last week. Soda ash is slightly easier, and bleaching powder half-a-crown a ton lower; sulphate of soda remains unchanged. To-day's prices are as follows:—Bleaching powder, in softwood casks, £5. 7s. 6d. per ton; caustic soda 77% £11. per ton; soda-ash, 1¼d. per degree; soda crystals, in casks, £2. 11s., per ton, gross weight; in 1 cwt. bags, £2. 13s. 6d. per ton, net weight; in 2 cwt. bags, £2. 11s. per ton, net weight; sulphate of soda, ground, in casks, £2. 5s. per ton; in bulk, £1. 15s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4¼d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, 1 cwt. kegs, £5. 15s. per ton, in 5—7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

Manufacturing coals continue firm in price, principally owing to the heavy foreign demand. Durham small is quoted 10s. per ton, and Northumberland steam small 8s. to 8s. 6d. per ton.

The Durham miners' application for a further advance in wages is still in abeyance, as the County average selling price for the last three months is not yet known.

The Patent List.

This list is compiled from Official sources in the Manchester Technica- Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Manufacture of Steel. J. Lewthwaite. 5,310. April 8.
Dynamometers. (Complete Specification.) H. H. Lake. 5,344. April 8.
Treatment of Uranium Compounds. T. G. Martyn. 5,348. April 8.
Manufacture of Artificial Building Material. C. O. Weber and G. F. Fre- man. 5,349. April 8.
Manufacture of Nitro-Cellulose. J. R. France. 5,364. April 8.
Guaiacol Ether. O. Imray. 5,366. April 8.
Refining of Camphor. (Complete Specification.) H. H. Lake. 5,367. April 8.
Oil Refining. (Complete Specification.) E. Noppel. B. Grosche and J. Bigler. 5,375. April 8.

Nitration and Denitration of Cellulose. H. de Chardonnet. 5,376. April 8.
Asbestos Filters.—(Complete Specification.) F. Breyer. 5,377. April 8.
Resins and Varnishes. A. F. St. George. 5,380. April 9.
Improved Anti-Corrosive Compound.—(Complete Specification.) D. Fulton. 5,387. April 9.
Reduction of Zinc Ores. O. Lumaghi. 5,407. April 9.
Steam Boiler and other Furnaces. T. G. Lishman. 5,410. April 9.
Wool Cleaning. W. P. Thompson. 5,413. April 9.
Brick Machines. W. W. Horn. 5,415. April 9.
Treatment of Organic Matters.—(Complete Specification.) J. Guillaume. 5,419. April 9.
Manufacture of Cellulose by Electricity. C. Kellner. 5,420. April 9.
Air Compressors. W. Tattersall. 5,429. April 10.
Manufacture of Water Gas. H. Williams. 5,434. April 10.
Improved Antiseptic Deodorant and Germicide. J. Wheeler. 5,438. April 10.
Manufacture of Nitrate of Ammonium. C. A. Burghardt. 5,442. April 10.
Water Filtration.—(Complete Specification.) J. A. Crocker. 5,445. April 10.
Smoke Combustion. W. Ackroyd, T. H. Ackroyd, and J. Willoughby. 5,453. April 10.
Application of Ceramic Colouring Matters to India-rubber. J. Mills. 5,455. April 10.
Manufacture of Sulphuric Acid. R. H. Wilson. 5,469. April 10.
Wool Scouring. G. W. Arnott, P. A. Olivier, and G. Seagrave. 5,482. April 10.
Improvements in Combustion of Fuel. J. Westray. April 11.
Steam Boilers and their Furnaces.—(Complete Specification.) E. J. Duff. 5,487. April 11.
Manufacture of Chlorine. W. Donald. 5,488. April 11.
Steam Boiler Furnaces. J. Riley. 5,489. April 11.
Filters. C. E. Gittens. 5,493. April 11.
Smoke Consumption. G. Hewitt. 5,501. April 11.
Automatic Measuring Apparatus for Liquids. J. Leloup. 5,514. April 11.
Improved Material for Building Purposes. P. M. Justice. 5,515. April 11.
Steam Generators.—(Complete Specification.) W. Chambers. 5,517. April 11.
Asphalt Paving. A. McLean. 5,533. April 11.
Furnaces for Burning Liquid Fuel. E. Manbre. 5,543. April 12.
Manufacture of Iron and Steel. A. Turner, A. Baird, and M. B. Baird. 5,545. April 12.
Manufacture of Wire. B. Mountain. 5,546. April 12.
Dyeing and Apparatus Therefor. B. Haigh. 5,547. April 12.
Manufacture of Chlorine. A. Campbell and W. Boyd. 5,571. April 12.
Cement Kilns. G. H. Skelsey. 5,581. April 12.

Gazette Notices.

Partnerships Dissolved.

WADDINGTON and RAMSBOTTOM, Manchester, paper merchants.

Adjudications.

FREDERICK ARTHUR PECK, Cleethorpes and Great Grimsby, chemists.
 MATTHEW HENRY NEALE, East Greenwich, chemist.

New Companies.

AUSTIN CRAVEN LIMITED.—This company was registered on the 12th inst., with a capital of £8,000, in £5. shares, 400 of which are £6. per cent. cumulative preference shares, to take over the business of Austin Craven, of Manchester, mineral water manufacturer, etc. The subscribers are:—

H. Cardwell, Hulme, Manchester, brewer	1
J. Thackeray, Hulme, Manchester, licensed victualler	1
Austin Craven, Hulme, Manchester, mineral water manufacturer	1
J. Pollitt, Church, hotel proprietor	1
P. R. Davies, Greenheys, licensed victualler	1
F. J. Ashbury, Manchester, chartered accountant	1
J. Winstanley, Moss Side, Manchester, cashier	1

CAM PORTLAND CEMENT COMPANY, LIMITED.—This company was registered on the 16th inst., with a capital of £20,000, in £1. shares, to purchase from T. Westrope Bowman, of Meldreth, Cambs., 7½ acres of land at Meldreth at the price of £200. per acre, with an option to purchase the adjoining 26½ acres within two years at the same price per acre, and to carry on business as cement, lime, and plaster-makers. The subscribers are:—

A. Russell, Huntingdon, draper	800
T. W. Bowman, Meldreth farmer	2,000
G. Worboy, Bassingham, builder	250
W. E. Cocks, Bassingham, engineer	250
J. Bowman, Lithington, farmer	200
Sarah D. Bowman, Meldreth	100
J. Westnights, Cambridge, analyst	70

DUNTON GREEN BRICK AND TILE WORKS.—This company was registered on the 11th inst., with a capital of £20,000, in £1. shares, to take over the business of brick and tile manufacturer, carried on by William James Thompson, at Dunton Green, near Sevenoaks, Kent. The subscribers are:—

J. Wescomb, Dunton Green, brickmaker	20
W. E. Scott, Dunton Green, tile maker	10
J. W. Breething, Dunton Green, brickmaker	5
W. J. Breething, Riverhead, Kent, brickmaker	5
A. E. Partridge, Dunton Green, clerk	2
R. Inkpen, Dunton Green, brickmaker	1
T. Collins, Dunton Green, brickmaker	1

ROBOTTOM BORACIC ACID SYNDICATE, LIMITED.—This company was registered on the 14th inst., with a capital of £5,000, in £20. shares, whereof 100 are founders' shares, to carry on in the United Kingdom, South America, or elsewhere, the business of miners, refiners, distillers, and manufacturers of boracic acid, borate of lime, borax, and other similar ore, mineral substance, or product. An unregistered agreement with Arthur Robottom will be adopted. The subscribers are:—

A. Robottom, 3, St. Alban's-villas, Highgate-road, merchant	1
M. L. Ingram, 18, Mincing-lane, merchant	1
L. H. Gillham, 69, Lombard-street, iron agent	1
W. H. Graybrook, Borax Works, Liverpool	1
Hodgson Watt, 12, Commercial Sale Rooms, broker	1
R. W. Shaw, 9, Fenchurch-street, shipowner	1
W. Shaw, 9, Fenchurch-street, shipowner	1

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending April 15th.

Acetate of Lime—
 U. S. £100. W. Thatcher
Acetic Acid—
 Holland, 180 pks. Beresford & Co.
 Holland, 350 pks. A. & M. Zimmermann
Antimony—
 Austria, 132 c. Typke & King
 N. Zealand, 77 J. Greig
Antimony Ore—
 Sydney, 14 t. Baak of N. S. Wales
 N. Zealand, 6 Cotesworth & Powell
 N. Zealand, 47 J. Greig
Barium Chloride—
 Germany, £40. Petri Bros.
Bones—
 Sydney, 9 t. Goad, Rigg, & Co.
 " 20 Anning & Cobb
 " 1 Flack, Chandler, & Co.
 Newcastle, 1 Dalgety & Co.
 N. S. Wales, 4½ t. C. M. Lampton & Co.
 Adelaide, 2 Anning & Cobb
 Holland, 10 t. J. Lucey & Sons
 U. S. 9 Goad, Rigg, & Co.
 Gibraltar, 9
 Brisbane, 8 Cotesworth & Powell
 Melbourne, 10 t. Culyerwell, Brooks, & Co.

Bone Meal—

E. Indies, 500 t. Hunter, Waters, & Co.
 " 500 A. Cross & Sons

Brimstone—

Italy, 400 t. W. C. Bacon & Co.
 " 10 F. Smith
 " 16 J. Kitchen
 " 108 G. Boor & Co.
 France, 1 E. W. Carling & Co.

Barytes—

Germany, 19 cks. P. Jantzen
 Norway, £131. J. Dickinson & Co., Ltd.
 Holland, 46 D. Storer & Sons, Ltd.
 Belgium, 39 Leach & Co.
 Italy, 10 G. C. Rouchetti

Borax—

Italy, £280 C. Tennant, Sons, & Co.

Chemicals (otherwise undescribed)

Germany, 91 J. Kitchen, Ltd.
 " 20 T. H. Lee
 " 81 F. Stahlschmidt & Co.
 " 8 A. & M. Zimmermann
 " 11 T. H. Lee
 " 11 Hernu, Peron, & Co.
 " 20 L. & I. D. Jt. Co.
 " 300 A. & M. Zimmermann
 " 20 G. Rahn & Co.
 France, 36 Carey & Sons
 Germany, 185 Phillips & Graves
 " 25 Elkan & Co.
 " 45 Phillips & Graves

Gaoutchoue—

Greytown, 5 c. Lewis & Peat
 Savanilla, 31 Steebel Bros.
 E. Indies, 26½ Wallace Bros.
 " 14 Forbes, Forbes & Co.
 France, 4 Keibel, Son, & Co.
 Greytown, 43 L. & I. D. Jt. Co.
 Germany, 7
 France, 56
 E. Indies, 58 Caldwell, Watson, & Co.
 Holland, 40 Matheson & Co.
 Germany, 50 L. & I. D. Jt. Co.
 Germany, 32
Carbonic Gas—
 Holland, £20. Phillips & Graves
Carbonic Acid—
 Holland, 930 pks. J. Owen

Cream of Tartar—

France, 5 pks. E. W. Carling & Co.
 Italy, 61 Thames S. Tug Co.
 France, 5 Ross & Deering
 Holland, 10 Middleton & Co.

Caustic Potash—

France, 5 drs. Petri Bros.

Copper Ore—

Natal, 28 t. H. Bash & Son
 Sydney, 58 A. Gibbs & Sons
 " 30 W. H. Pridham & Co.
 " 1½ Vivian, Younger, & Co.

Cobalt Ore—

Sydney, 60 t. Weatherley, Mead, & Co.
 " 33 Watt, Gilchrist, & Co.

Dyestuffs—

Indigo

E. Indies, 227 cts. L. & I. D. Jt. Co.
 " 3 Parsons & Keith
 Aden, 25 L. & I. D. Jt. Co.
 Greytown, 1 bl. Lewis & Peat
 E. Indies, 2 pks. T. Ronaldson & Co.
 " 5 cts. 1 bx. G. Ward & Sons
 " 8 Arbuthnot, Latham, & Co.
 " 29 L. & I. D. Jt. Co.
 " 12 J. Owen
 " 8 Benecke, Souchay, & Co.
 " 126 L. & I. D. Jt. Co.
 " 8 Elkan & Co.
 " 10 G. N. Railway Co.
 " 4 bxs. 54 cts. L. & I. D. Jt. Co.
 " 13 Stansbury & Co.
 " 15 cts. Benecke, Souchay, & Co.
 Greytown, 6 srns L. & I. D. Jt. Co.
 La Libertad, 8 srns. Cotesworth & Powell

Myrabolans

E. Indies, 1,366 pks. Benecke, Souchay & Co.
 " 825 bgs. L. & I. D. Jt. Co.
 " 2,640 J. Grave
 " 1,617 Arbuthnot, Ewart, & Co.
 " 1,670 pks. L. & I. D. Jt. Co.
 " 1,876 Ralli Bros
 " 373 Arbuthnot, Ewart, & Co.

11	W. H. Cole & Co.
12	W. M. Smith & Sons
15	Swanston & Co.
20	J. Goddard & Co.
42	W. M. Smith & Sons
19	Swanston & Co.
4	Kuhner, Hendschel Co.
9	Johnson, Rolla, & Co.
Bark	
25 pks.	Dalgety & Co.
74 pks.	Burt, Boulton, & Co.
15	Humphrey & Co.
2	R. J. Fullwood & Bland
1 pkg.	M. D. Co.
6 pks.	A. Laming & Co.
10	E. Austin & Co.
10	F. Roberts
20 cs.	Wrightson, & Son
12	Brinkmann & Co.
16 pks.	Brinkmann & Co.
24	Beresford & Co.
29	Elkan & Co.
12	L. & I. D. Jt. Co.
77	Brinkmann & Co.
116 pks.	W. H. Cole & Co.
Bark	
18 t.	S. Barrow & Bros.
163	A. & W. Nesbitt
50 t.	Devitt & Hett
112 1/2	Baxter & Hoare
15 1/2	G. B. Mackreth
115	Baxter & Hoare
16	G. B. Mackreth
816 pks.	B. Jacob & Sons
188	"
6 pks.	L. & I. D. Jt. Co.
6 pks.	Hurford & Middleton
2	Hoare, Wilson & Co.
1 (otherwise undescribed)	
1 pks.	Burt, Boulton, & Co.
£150	Beresford & Co.
35	"
17	"
70	T. H. Lee
ha—	
134 c.	Hultenbach & Co.
940	H. W. Jewesbury & Co.
80 pks.	450 c. Horne & Co.
100	550 F. J. Warren
40	200 T. M. Duché & Sons
50	400 " J. Knill & Co.
1	190 " Co.
228	1,824 Anderson, Weber, & Co.
15	90 M. D. Co.
8	74 L. & I. D. Jt. Co.
25	200 L. Sutro & Co.
160	468 " Barrett, Tagant, & Co.
140	840 " Page, Son, & East
40	217 " Pillow, Jones, & Co.
60	326 J. Knill & Co.
21	190 J. Barker & Co.
180	180 " Spies, Bros., & Co.
6	10 P. Windmuller
100	550 J. Knill & Co.
13	110 Union Lighterage Co.
100	236 J. F. Ohlmann
29	200 J. C. Atkins & Co.
50	100 Baxter & Hoare
100	400 Harnett & Co.
100	110 T. M. Duché & Sons
35	65 J. Barber & Co.
160	660 T. H. Lee
50	100 C. Atkins & Co.
3	25 H. Lorenz
25	220 Anderson, Weber, & Smith
09	1,020 " "

France,	200	200	Baxter & Hoare
U. S.,	170	550	A. Ashby
"	2,000	2,000	Union Lighterage Co.
"	500	500	M. D. Co.
Guano—			
Sweden,	50 t.		Anglo Swedish Co.
Isinglass—			
Sts. Settlements,	4 pks.		L. & I. D. Jt. Co.
E. Indies,	13 pks.		"
Singapore,	3		"
Penang,	34 pks.		"
China,	1 pkg.		E. Boustead & Co.
Germany,	5 pks.		Atkinson, Bethé, & Co.
Rio Janeiro,	1 pkg.		L. & I. D. Jt. Co.
E. Indies,	10		"
Singapore,	2 pks.		Hale & Son
Manure—			
Phosphate Rock			
U. S.,	2,000 t.		Fox, Roy, & Co.
St. Valery,	167		Lawes Manure Co., Limited
France,	305		Anglo Contl. Guano Wks.
U. S.,	5		J. Burnett & Sons
Germany,	50		C. A. & H. Nichols
Sydney,	11		F. W. Berk & Co.
Germany,	50		Goad, Rigg, & Co.
E. Indies,	14 t.		Perkins & Homer
Germany,	50		G. H. Wilson & Sons
"	60		F. W. Berk & Co.
E. Indies,	500		Adley, Tolkin, & Co.
Manganese—			
Germany,	£30		Burgoyne, Burbidge, & Co.
Manganese Ore—			
Adelaide,	201 t.		F. Manders
Naphtha—			
Holland,	73 drs.		Burt, Boulton, & Co.
Potash—			
Germany,	18 cks.		W. Balchin
U. S.,	111 c.		Charles & Fox
Plumbago—			
E. Indies,	138 cks.		H. W. Ison
"	174		Barron & Gibson
"	67		H. J. Perlbach & Co.
"	183		J. Thredder, Son, & Co.
Germany,	61		Prcep. Chamb's Whf.
"	18		B. Gallaway
"	4		T. Jordan & Co.
Pitch—			
U. S.,	48 brls.		W. Isted
France,	92		Berlandina Bros.
Pearl Ash—			
U. S.,	52 c.		Charles & Fox
France,	20		Petri Bros.
Paraffin Wax—			
U. S.,	82		G. H. Frank
"	120		Rose, Wilson, & Sons
"	48		"
"	200		E. H. Holdsworth
Red Arsenic—			
Germany,	£36		"
Saltpetre—			
E. Indies,	1,629 bgs.		C. Wimble & Co.
"	13,964		Brown & Elmslie
"	742		Clift, Nicholson, & Co.
"	610		C. Wimble & Co.
"	1,173		Ralli Bros.
Stearine—			
U. S.,	56 cks.		Rose, Wilson, & Co.
Melbourne,	339		Ross & Deering
Germany,	393		W. Balchin
Sodium Acetate—			
Belgium,	£95		Soundy & Son
"	116 c.		A. Zumbek & Co.
France,	214		"
Sugar of Lead—			
Germany,	28 pks.		Beresford & Co.
Sulphur Oil—			
Italy,	£520		A. Laming & Co.
Tartaric Acid—			
Holland,	19 pks.		I. Sauer
France,	18		A. Hughes
Holland,	£350		B. & F. Wf. Co.
"	650		Middleton & Co.
"	1,485		W. C. Bacon & Co.
"	475		B. & F. Wf. Co.
"	120		C. Christopherson & Co.
"	120		Hernu, Peron, & Co.

Tartars—			
Italy,	53 pks.		B. Jacob & Sons
Ultramarine—			
Holland,	4 cks.		Spies, Bros., & Co.
"	22 cs.		Hernu, Peron, & Co.
"	8 pks.		Ohlenschlager Bros.
"	11		Haefner, Hilpert, & Co.
Belgium,	10		Leach & Co.
Germany,	10		G. Steinhoff
Zinc Oxide—			
Holland,	170 cks.		M. Ashby
U. S.,	100 brls.		"
Germany,	50 cks.		D. Storer & Sons, Limited
Holland,	100 brls.		N. Smith
Germany,	10 cks.		Beresford & Co.
Holland,	434		Soundy & Son
Zinc Sulphate—			
Germany,	£80		J. Matton

LIVERPOOL

Week ending April 17th.

Antimony Ore—			
Marseilles,	967 bgs.		
Hamburg,	415		
Acetate of Lime—			
St. Nazaire,	84 cks.		
New York,	1,202 bgs.		
Bones—			
Boston,	162 sks.		J. Gordon & Co.
New York,	407 bgs.		
Constantinople,	15 t.		
Ceara,	173 bgs.		Leech, Harrison & Co.
"	785		R. Singlehurst & Co.
"	100		
Bone Ash—			
Rosario,	220 bgs.		
Barytes—			
Rotterdam,	17 cks.		
Boric Acid—			
Hamburg,	5 cks.		
Caoutchouc—			
St. Nazaire,	4 bls.		
Ceara,	2		
"	5		Leech, Harrison & Co.
"	2		Stadebauer & Co.
Bayin,	5 bgs.		A. Millerson & Co.
"	3		Halsan & Co.
"	5		Edwards Bros.
"	14		3 brls. Pickering & Berthoud
Half Jack,	2		M. L. Levin
Three Towns,	1 ck.		
Grand Bassam,	1 brl.		H. S. Attia Bros.
Sierra Leone,	76		Pickering & Berthoud
"	18 pns.		4 brls. Paterson, Zachonis & Co.
"	18 brls.		Cie Francaise Co.
Bathurst,	22 cks.		
"	1		Radcliffe & Durant
"	4		A. Cros & Co.
Salt Pond,	2 pks.		A. Reis
Cape Coast,	1 brl.		Edwards Bros.
"	1 cs.		Davies, Robbins & Co.
"	1		Emil Grund
"	5		Mordaunt Bros.
"	9		5 A. Miller, Bros. & Co.
"	6		L. Hart & Co.
"	2		W. B. McIver & Co.
Axim,	4 cks.		1 cs. Pickering & Berthoud
"	1 bg.		Radcliffe & Durant
Attaboce,	6		Edwards Bros.
"	28		Pickering & Berthoud
Old Calabar,	5 cks.		Pickering & Berthoud
Forcados,	1 brl.		J. Chorlton & Co.
Addab,	13		W. J. Rodatz & Co.
Accra,	2 cs.		4 cks. G. W. Christie & Co.
"	3 pns.		1 brl. 1 cs. F. & A. Swanzy
"	13		Hutton & Co.
"	3		1 Davies, Robbins & Co.
"	10		2 3 J. J. Fischer & Co.

Salt Pond,	2 cks.		H. B. McIver & Co.
"	2 bxs.		Pickering & Berthoud
"	4 brls.		2 cs. Miller Bros.
"	1		T. Millington & Co.
"	2		Edwards Bros.
Axim,	2 bgs.		A. Verdis
Grand Bassam,	19 cs.		1 Radcliffe & Durant
"	1		brl Latchford & Co.
"	1		S. & C. Nordlinger
"	5		bgs. W. D. Woodin
"	4		A. Reis
"	1		Edwards Bros.
"	1		Millward, Bradbury & Co.
Sierra Leone,	1		F. & A. Swanzy
"	42 cks.		Fisher & Randall
"	17		Pickering & Berthoud
"	7		Broadhurst, Sons & Co.
Accra,	2 brls.		1 cs. Hutton & Co.
"	1		Elder, Dempster & Co.
"	1		Pitt Bros. & Co.
"	1		Radcliffe & Durant
C.C. Castle,	18 cks.		1 cs. Ihlers & Bell
"	2		F. & A. Swanzy
"	3 brls.		C. L. Clare & Co.
"	1		1 cs. E. Grime
"	1		Pitt Bros. & Co.
Axim,	3		Millward, Bradbury & Co.
"	1 bg.		Radcliffe & Durant
"	1		Pickering & Berthoud
Akassa,	16 cs.		80 bgs. Royal Niger Co.
Quittah,	14 brls.		2 pns. F. & A. Swanzy
Accra,	13 cks.		1 cs. Pickering & Berthoud
"	1		F. Mosher
"	38		J. P. Werner
"	8		4 J. J. Fischer & Co.
"	6		1 F. & A. Swanzy
"	4		M. Herschell & Co.
"	11		Davies, Robbins & Co.
"	7 brls.		C. Lane & Co.
"	1		Edwards Bros.
Chemicals (otherwise undescribed)			
Rotterdam,	2 cks.		
"	1		
Cream of Tartar—			
Bordeaux,	3 cks.		
Genoa,	12		
Barcelona,	12		
Rotterdam,	10		
Chloral Hydrate—			
Rotterdam,	3 cs.		
Copper Ore—			
Galveston,	3,050 sks.		
New York,	3,959		
Dyestuffs—			
Sumac			
Catania,	10 bls.		
Palermo,	860 bgs.		
Cutch			
Rangoon,	3,105 bxs.		
Logwood			
Laguna,	326 t.		R. B. Watson & Co.
Cochineal			
Grand Canary,	4 bgs.		Widow, Duranty & Son
Teneriffe,	25		Bruce & White
"	16		H. R. Toby & Co.
Grand Canary,	30		Lathbury & Co.
Divi Divi			
Hamburg,	207 bgs.		
Extracts			
St. Nazaire,	350 cks.		
Havre,	25 cs.		15 cks. Cunard S.S. Co.
Bordeaux,	1		G. G. Blackwell
Gambier			
Singapore,	3,591 bls.		
Glucose—			
Hamburg,	25 cks.		
Philadelphia,	10		50 bgs.
"	88 brls.		
Glycerine—			
Rotterdam,	20 cs.		
Horn Piths—			
Antwerp,	a quantity.		
Iodine—			
Valparaiso,	22 brls.		Gibbs & Sons
"	51		A. Gibbs & Sons

Litharge—
Hamburg, 40 cks.
Manganese Ore—
Gothenburg, 160 t. MacQueen Brs.
Manganese Powder—
Hamburg, 1 ck.
Potassium Muriate—
Hamburg, 203 bgs.
Pyrites—
Huelva, 2,055 t. Matheson & Co.
" 1,420 " "
" 1,386 Tennants & Co.
" 1,234 " "
Paraffin Wax—
Rangoon, 525 bxs.
Baltimore, 100 brls.
Phosphate—
Bruges, 1,200 bgs.
St. Valery, 210 t.
Potash—
Rotterdam, 29 cks.
Salt—
Hamburg, 100 bgs.
Saltpetre—
Hamburg, 32 cks.
" 20 "
Antwerp, 135 bgs. J. T. Fletcher & Co.
Stearine—
Rotterdam, 20 bls.
Antwerp, 39 bgs.
Sulphate—
Antwerp, 6 cks.
Sulphur—
Catania, 120 bgs. 50 brls.
Palermo, 60 "
Sodium Nitrate—
Rotterdam, 9 cks.
Tar—
Wilmington, 3,300 brls.
Tartaric Acid—
Rotterdam, 48 cks.
" 15 "
Tartars—
Bari, 5 cks.
Naples, 13 "
Rotterdam, 1 "
Ultramarine—
Rotterdam, 4 cks. 50 brls.
" 14 cs. 19 cks.
Zinc Oxide—
Hamburg, 10 cks.
Rotterdam, 30 "
New York, 50 brls.
Antwerp, 20 "
" 5 "

GLASGOW.

Week ending April 17th.

Alkali—
Rotterdam, 200 bgs. J. Rankine &
Son
Chemicals (*otherwise undescribed*)
Hamburg, 1 cs.

Dyestuffs—
Allizarine
 Rotterdam, 44 cks. J. Rankine & Son
 65
Extracts
 Antwerp, 6 cks.
Gutch
 Rangoon, 1,684 bxs. P. Henderson
 & Co.
Fustic
 Jamaica, 42 t. 8 c. Wallace,
 Wilkie, & Co.
Logwood
 Jamaica, 20 t. 18 c. Wallace,
 Wilkie, & Co.
Sumac
 New York, 40 brls.
Gutta Percha—
 Amsterdam, 5 bgs.
 Hamburg, 3 bskts. 1 bg.
Glucose—
 New York, 105 brls.
 " 300
 Rotterdam, 10 cks. J. Rankine &
 Son
Saltpetre—
 Rotterdam, 7 cks. J. Rankine &
 Son
Sulphur—
 Catania, 1,200 t.
Sulphur Ore—
 Drontheim, 250 t.
Salt—
 Hamburg, 143 cks. 508 bgs. 50 t.
Stearine—
 New York, 11 brls.
 " 14
Tar—
 Wilmington, 1,300 brls.
Ultramarine—
 Rotterdam, 3 cs. J. Rankine & Son
 3 cks. "
 Antwerp, 2 cs. "
Zinc Ashes—
 Antwerp, 5 cks.
Zinc Oxide—
 Antwerp, 100 cks.
 New York, 150 brls.
 Rotterdam, 100

HULL.

Week ending Apr. 17th.

Albumen—
Reval, 30 cks. Wilson, Sons, & Co.
Acids (*otherwise undescribed*)
Rotterdam, 2 cks. Hutchinson & Son
Antimony—
Reval, 1 ck.
Barytes—
Hamburg, 68 cks. Wilson, Sons, & Co.
Rotterdam, 17 brls.
Antwerp, 25 Bailey & Leetham
Chemicals (*otherwise undescribed*)
Dunkirk, 30 pks. Wilson, Sons, & Co.
Antwerp, 200 " "
Bremen, 20 kgs. 3 cs. Veltmann & Co.

Dyestuffs—		
Alizarine		
Rotterdam,	10 cks.	Hutchinson & Son
"	35	"
"	20	"
"	15	"
"	12 pks.	G. Lawson & Sons
Extracts		
Trieste, 20 brls.		Wilson, Sons, & Co.
Fiume, 900		"
Rouen 85 cks.		Rawson & Robinson
Yalonia		
Smyrna, 478 bgs.		"
Trieste, 76		Wilson, Sons, & Co.
Sumac		
Trieste, 75 bls.		Wilson, Sons, & Co.
Palermo, 300 bgs.		Kupers, Ostler, & Scott
Madder		
Rotterdam, 2 cks.		G. Lawson & Sons
Glycerine —		
Hamburg, 5 drums.		"
Glucose —		
Hamburg, 200 bgs.	38 cks.	Wilson, Sons, & Co.
"	22 cks.	Bailey & Leetham
"	5	"
"	49	"
Stettin, 40 bgs.		Wilson, Sons, & Co.
Rotterdam, 50		Hutchinson & Son
Manure—		
Kainit		
Hamburg, 500 bgs.		E. Kipps & Co.
"	50 t.	"
Ghent, 160		Wilson, Son, & Co.
Pitch—		
Hamburg, 65 brls.		"
Phosphate—		
Antwerp, 90 t.		Bailey & Leetham
Potash—		
Rotterdam, 11 cks.		G. Lawson & Sons
Potassium Muriate—		
Rotterdam, 2 cks.		Hutchinson & Son
Salt—		
Hamburg, 508 bgs.		Bailey & Leetham
"	508	C. M. Lofthouse & Co.
Ultramarine—		
Rotterdam, 4 cks.		"

TYNE.

Week ending April 17th.

Alum Earth—	
Hamburg, 19 cks.	Tyne S. S. Co.
Copper Ore—	
Huelva, 318 t.	Bede Metal Co.
Copper Precipitate—	
La Jaja, 1,418 bgs.	Bede Metal Co.
Huelva, 2,725	
" 23 cks. 4,425 bgs.	H. Scholfield & Son
Glucose—	
Hamburg, 5 cks.	Tyne S. S. Co.

Manure—	
Phosphate Rock	
Coosaw, 1,820 t.	Langdale's Manure Co
Manganese Ore—	
Hamburg, 30 t.	Tyne S. S. Co
Huelva, 200 t.	Scott Bros
Pyrites—	
Huelva, 1,170 t.	Scott Bros
La Jaja, 250 t.	Bede Metal Co
Phosphate—	
Aruba, 450 t.	Langdale's Manure Co
Rennet—	
Copenhagen, 2 cks.	Wilson, Sons, & Co
Soda—	
Rotterdam, 15 cks.	Tyne S. S. Co
Zinc Oxide—	
Antwerp, 25 bris.	Tyne S. S. Co

GOOLE.

Week ending April 9th.

Alum—
Antwerp, 39 cks.
Chrome Chlorate—
Rotterdam, 12 cks.
Dyestuffs—
 Diyl Diyl
 Hacha, 217 t.
 Madder
 Rotterdam, 6 cks.
 Alizarine
 Rotterdam, 23 cks.
 Dyestuffs (*otherwise undescribed*)
 Boulogne, 1 cs. 54 cks.
Glycerine—
 Hamburg, 2 drums. 3 cs.
 Rotterdam, 10
Glucose—
 Hamburg, 53 cks. 200 bgs.
 Dunkirk, 120
Potash—
 Rotterdam, 5 cks.
Soda—
 Rotterdam, 8 cks.
Salt—
 Hamburg, 554 t. 227 cks. 400 bgs.
Saltpetre—
 Rotterdam, 225 bgs.
Tartar—
 Rotterdam, 4 cks.

GRIMSBY.

Week ending Apr. 12th.

Albumen—
Hamburg, 5 cks.
Dieppe, ¹⁴
Chemicals (*otherwise undescribed*)
Hamburg, 13 pks.
Glucose—
Hamburg, 12 cks.
Zinc Ashes—
Antwerp, 16 cks.

EXPORTS OF CHEMICAL PRODUCTS

OR

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.					
<i>Week ending April 12th.</i>					
Arsenic—					
Cape Town,	1 t	£18			
Yokohama,	3 10 c.	49			
Ammonium Carbonate—					
Amsterdam,	16 c.	£25			
Yokohama,	1 t. 10	57			
New York,	13 4	555			
Ammonium Sulphate—					
Hamburg,	130 t. 16 c.	£1,495			
Cologne,	27 12	325			
Ghent,	2 2	26			
"	42 10	500			
Antwerp,	172 4	2,065			
Rotterdam,	100	1,200			
St. Kitts,	18	221			
Martinique,	201 10	2,400			
Bruges,	40 7	478			
Ghent,	25	284			
Antwerp,	253	3,036			
Alum—					
Salonica,	10 t.	£70			
Alum Cake—					
Calcutta,	26 t. 3 c.	£100			
Bisulphide of Carbon—					
Philadelphia,	4 t. 17 c.	£64			
Caustic Soda—					
Auckland,	5 t. 8 c.	£37			
Lyttleton,	2 15	28			
E. London,	1 13	66			
Copper Sulphate—					
Barcelona,	10 t. 1 c.	£217			
Tarragona,	15	307			
Genoa,	35	819			
"	5	119			
Tarragona,	15	321			
"	5	125			
"	5	107			
Pasages,	19 11	486			
Bilbao,	20 10	487			
Tarragona,	5 2	130			
Leghorn,	5 19	150			
Santos,	9	14			
Algoa Bay,	2 4	54			
Lisbon,	4 18	123			
Carbolic Acid—					
Melbourne,	400 gls.	£47			
Pt. Elizabeth,	1 cs.	17			
Aden,	15 drs.	22			
Rotterdam,	4 t. 16 c.	134			
Stettin,	15	65			
Cream Tartar —					
Rockhampton,	1 t.	£117			
Melbourne,	1 1 c.	106			
Brisbane,	5	25			
Canterbury,	5	30			
Carbolic Solid—					
Hiego,	30 cs.	£170			
Yokohama,	20	119			
Genoa,	5 drms.	76			
New York,	20 cks.	246			
Genoa,	1 t. 6 c.	7			
Barcelona,	4 8	22			
Oitic Acid—					
Rotterdam,	10 c.	£57			
Hamburg,	20 cks.	14			
Reval,	2 t. 10	37			
Genoa,	2 5	33			
Antwerp,	10 7	7			
Hamburg,	5 5	3			
Barcelona,	3 10	48			
Genoa,	1	13			
"	8	5			
Leghorn,	2	1			
Oporto, 5 pks.		3			
Lisbon,	16.	10			
Valencia,	1	13			
Launceston, 1 ck.		1			
Antwerp,	9	13			
Hamburg,	2 4	36			
Oporto,	1 5	3			
Melbourne,	1	14			
Antwerp,	10 7	7			
Bombay,	2	1			

Coal Products—**Solvent Naphtha**

Calais, 24 cks. £87

Toluole

Rotterdam, 18 t. 17 c. £435

Naphthalene

Philadelphia, 79 cks. £100

Trepport, 39 20

Rotterdam, 27 hrs. 167

Hamburg, 11 t. 5 c. 167

Stettin, 5 2 45

Anthracene

Rotterdam, 252 cks. £2,222

" 126 1,275

Dusseldorf, 135 737

Rotterdam, 68 388

Benzol

Rotterdam, 47 cks. £340

" 50 dms. 988

Antwerp, 19 puns. 340

Trepport, 11 270

Rotterdam, 54 cks. 635

" 24 25 dms. 751

Calais, 19 417

Rotterdam, 20 pns. 328

Tar

Sulina, 30 brls. £35

Bombay, 145 rults. 120

" 37 44

Algoa Bay, 500 drms. 30

Calcutta, 200 rults. 109

Bone Pitch

Rotterdam, 12 cks. £25

Rangoon, 30 pks. 12

Sydney, 20 pks. 19

Madras, 50 rults. 26

Cette, 1,165 t. 2,372

Pitch

Sulina, 15 brls. £10

Bombay, 100 57

New York, 4 cks. 10

Antwerp, 796 t. 1,270

Dunkirk, 406 652

Amsterdam, 938 1,649

Antwerp, 419 625

Genoa, 1,814 3,500

Rotterdam, 12 cks. 25

Rangoon, 30 pks. 12

Sydney, 20 pks. 19

Madras, 50 rults. 26

Cette, 1,165 t. 2,372

Sulina, 15 brls. 10

Bombay, 100 57

New York, 4 cks. 10

Antwerp, 380 t. 600

Dunkirk, 416 630

" 256 422

" 150 230

Amsterdam, 938 1,642

Antwerp, 419 625

Genoa, 1,814 3,500

Chemicals (otherwise undescribed)

Brisbane, 67 pks. £83

Genoa, 22 cks. 70

Dunedin, 25 129

Rio Janeiro, 7 78

Auckland, 8 40

" 3 38

Disinfectants—

Paris, 420 gls. £42

Hamburg, 33 cks. 215

Melbourne, 2 cs. 26

Calcutta, 30 drs. 30

Melbourne, 42 pks. 53

Brisbane, 15 cs. 24

Lyttelton, 4 13

Sydney, 6 33

Fluoric Acid—

Melbourne, 540 gls. 33

Guano—

Antigua, 16 t. 113

Manure—

Rouen, 48 t. £200

Gandia, 539 19

Valencia, 119 17

Rotterdam, 17 5

" 72 6

" 19 16

Tarragona, 145 1,160

Alicante, 75 600

Valencia, 350 2,800

Malaga, 50 400

St. Lucia, 38 380

Demerara, 20 200

Stettin, 68 390

Rotterdam, 29 5

Gothenburg, 283 11

Genoa, 10 100

Valencia, 70 11

Lyttelton, 150 2,025

Gothenburg, 199 839

Melbourne, 80 1,080

Nitric Acid—

Auckland, 4 cs. £18

Oxalic Acid—

Rotterdam, 5 t. 7 c. £250

Antwerp, 172 4 2,065

Lisbon, 1 4 34

Potassium Chlorate—

Higo, 5 t. £316

Hong Kong, 2 5 c. 96

" 1 46

New York, 5 222

" 2 28

Yokohama, 10 22

Potassium Carbonate—

Santos, 5 cs. £12

Potassium Bicarbonate—

Salonica, 7 c. £13

Potassium Bichromate—

Hong Kong, 4 c. £11

Phosphorus—

Kobe, 1 t. 2 c. £201

Yokohama, 10 cs. 119

Higo, 30 415

Potash—

Calcutta, 8 cs. £48

Potash Crystals—

Sydney, 13 pks. £35

Potash Solution—

Sydney, 3 cs. £15

Sheep Dip—

Port Elizabeth, 3 t. 8 c. £150

Algoa Bay, 2 10 140

" 1 47

" 25 cs. 66

Sodium Bicarbonate—

Auckland, 5 t. 8 c. £27

Sodium Silicate—

Auckland, 2 t. 5 c. £10

Sulphur—

Madras, 4 t. 19 c. £38

Amsterdam, 1 10 34

Sulphuric Acid—

Karrachi, 50 drs. 66

Sulphur Flowers—

Oporto, 19 t. £175

" 26 230

E. London, 100 pks. 52

Lisbon, 1,262 brls. 973

Salammoniac—

Salonica, 2 t. 2 c. £64

" 7 brls. 36

Galatz, 1 t. 1 c. 30

Paris, 1 8 49

Yokohama, 10 cks. 85

Samsoun, 3 c. 6

Soda Crystals—

Rockhampton, 30 t. £93

Hong Kong, 8 2 c. 94

Saltpetre—

Melbourne, 2 £45

Rio Janeiro, 2 10 c. £56

Oporto, 7 8 152

Rio Janeiro, 2 7 53

Adelaide, 2 7 53

Gibraltar, 1 10 35

Rockhampton, 25 528

" 10 11

Sodium Bisulphide—

Philadelphia, 5 c. £21

Sodium Carbonate—

Rockhampton, 1 t. 19 c. £10

Sodium Sulphate—

Antwerp, 140 t. £175

Sanitas Powder—

Bombay, 12 t. 1 c. £114

Salteake—

Antwerp, 125 t. £220

Soda and Lime Salts—

Halifax, 10 pks. £115

Superphosphate—

Martinique, 267 t. 1 c. £1,060

Tartaric Acid—

Rockhampton, 10 £72

Brisbane, 5 33

Adelaide, 11 66

Lyttelton, 6 cs. 41

Melbourne, 20 137

Cossack, 3 25

Canterbury, 5 35

Ammonium Sulphate—

Gr. Canary, 10 t. 2 c. £120

Valencia, 5 t. 1 t. q. 670

Ammonium Muriate—

New York, 5 t. 2 c. 2 q. 127

Acetic Acid—

Porto Alegre, 3 2 £8

Vera Cruz, 1 t. 4 19

Albumen—

New York, 2 t. 7 c. 20

Antimony Regulus—

New York, 2 t. 15 c. 210

Alum Cake—

Gothenburg, 10 t. 5 c. 38

Arsenic Acid—

New York, 15 t. 7 c. 2 q. 218

Ammonium Carbonate—

Genoa, 10 c. £30

Naples, 9 3 q. 16

Genoa, 1 t. 15 3 49

Venice, 1 3 2 32

St. Louis, 5 1 3 494

Alum—

Cape Town, 2 t. 14 c. £14

Galatz, 2 17 1 q. 14

St. John's, N. B., 2 t. 12 c. 12

Calcutta, 45 4 220

Galatz, 3 1 16

Havana, 8 12 43

Melbourne, 3 7 17

Portland, 7 15 39

Montreal, 5 6 24

Vera Cruz, 9 7

Baltimore, 27 5 2 q. 126

Bombay, 1 1 30

Melbourne, 4 31

Calcutta, 10 30

Bleaching Powder—

Antwerp, 79 cks. £150

Boston, 394 140

Genoa, 19 47

Hamburg, 50 66

Ghent, 107 66

Antwerp, 30 66

Bari, 6 66

Bombay, 10 cs. 100

Calcutta, 100 100

New York, 41 pks. 100 brls. 85 tcs.

Borax—

Yokohama, 3 t. 8 c. £85

Rouen, 4 87

St. John's, N. B., 3 3 q. 87

Santander, 6 1 11

Malaga, 6 1 10

Borax Salts—

Havana, 1 t. £100

Boric Acid—

Marseilles, 10 c. £80

Chalk Precipitate—

New York, 3 t. 10 c. 3 q. £65

Chromic Acid—

Hamburg, 4 c. 2 q. £11

Citric Acid—

Genoa, 10 3 71

Caustic Soda—

Ancona, 20 dms. £45

Barcelona, 200 £56

Bilbao, 100 152

Boston, 490 10 brls. 53

Carril, 10 53

Ceara, 50 35

Chicago, 100 528

Genoa, 40 11

Hamburg, 58 11

Jaffa, 16 11

Naples, 32 11

Nantes, 72 11

New York, 450 270

Philadelphia, 100 270

Rio de Janeiro, 15 25 bxs.

Rotterdam, 10 25 bxs.

San Francisco, 50 25 bxs.

Seville, 100 25 bxs.

Valencia, 16 10 brls.

Vigo, 10 brls. 34

Antwerp, 34 10

Charlotte Town, 10 10

Copenhagen, 43 43

Genoa, 65 65

Hamburg, 10 10

Honolulu, 20 20

Maceio, 30 30

Matanzas, 96 96

New York, 474 110

Pernambuco, 50 50

Philadelphia, 150 brls. 150 brls.

Portland, 204 dms. 204 dms.

Rio Grande du Sol, 30 dms. 30 dms.

Rotterdam, 20 20

Rouen, 8 8

Santos, 10 10

Seville, 30 brls. 30 brls.

Singapore, 3 3

Stettin, 60 60

Sydney, 35 35

Manure—

Valencia,	60 t.	£140
Havre,	100 3 c. 2 q.	290
St. Nazaire,	23 12 3	171
Bordeaux,	250 5	772
Antwerp,	9 13	71
St. Malo,	273 10 3	1,308
St. Nazaire,	176 9 2	880

Magnesia—

Leghorn,	2 cs.	
London,	12	
Mexico City,	1	

Magnesium Chloride—

Nantes,	5 t. 8 c.	£27
Rouen,	12 10 3 q.	27
Montreal,	2 10	7

Phosphorus—

Canton,	1 c. 3 q.	£77
Kingston,	3	11
Vera Cruz, 1 t. 14	1	210
Monte Video,	9	54

Potassium Carbonate—

New York,	33 t. 8 c.	£397
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Potash—

Lisbon,	3 c. 2 q.	£25
Amsterdam, 1 t. 8		53
Havana,	5	11

Potassium Chlorate—

New York,	3 t. 15 c.	£200
Boston,	2	130
Leghorn,	15	35
Boston,	2 10	134
Newfairwater,	2 10	105
Copenhagen,	3	137
Hamburg,	2 10	105
Santos,	2	93
New York,	15	595
Monte Video,	1 1 3 q.	48
Hamburg,	1	47
Santos,	3	135

Pitch—

Carril,	60 brls.	
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Sodium Nitrate—

Almeria,	3 t. 14 c. 1 q.	£31
Shanghai,	5 1 1	42
Trieste,	42 10 2	356

Soda Ash—

Baltimore,	133 cks.	
Boston, 122 tcs.	2,462 bgs	
Canada,	11	
Ceara,	40 brls.	
Jaffa,	23	
Maranham,	30	
New York,	645	478 tcs.
Payasand,	100	
Philadelphia,		430
Rio Janeiro,	4	
Valparaiso,	4	
Varna,	30	
Baltimore, 709 tcs.	473 cks.	
Boston, 57	1,800 bgs	300
Bruges,		8
Buenos Ayres,	200 brls.	
Calcutta,	7	
Constantinople,	200	
Malta,		20
New York, 1,833 tcs.	203	
Philadelphia, 887		
Portland M.,		133
Portland Or.,		2
Puerto Cabello,	32 brls.	
Rio Janeiro,	315	
Rosario,	50	
Santos,	45	

Sodium Bicarbonate—

Amapala,	20 kgs.	
Callao,	25	
Constantinople,	30	
Leghorn,	20	
Nagasaki,	200	
Rotterdam,	20	
Stettin,	45	2 cks.
Trieste,	300	20
Bari,	50	
Antwerp,		18
Bremen,	25	
Buenos Ayres,	100	
Calcutta,	580	
Genoa,	51	
Hamburg,	20	
Rotterdam,		20
Santander,	20	
Seville,	100	
Stettin,		320 pks.

Salt—

Algoa Bay,	5 t.	
Calcutta,	4,630	
Ghent,	139	
Grand Bassa,	7	3 c.
Kingston,	7	
New York,	250	
Para,	288	13
Paspelac,	389	
Portland,	5	

Port Natal,

Sierra Leone,	110	
Sinoe,	10	
Boston,	66	
Brisbane,	50	
Baltimore,	100	
Amsterdam,	250	
Black Point,	5	
Boston,	30	
New York,	25	
Bruges,	205	
Calcutta,	12,464	
Cavally,	11 1/2	
E. London,	24 1/2	
Grand Bassa,	25	
Halifax,	290	
Hamburg,	193	
Manaos,	19	13
Milwaukee,	65	
Monte Video,	11	3
Oporto,	50	
Quebec,	400	
St. John's,		25 cs.
Salt Pond,	25	
San Francisco,	93	
Shediac,	400	
Sierra Leone,	100	

Soda Crystals—

Boston, 100 kgs.	672 brls.	
Calcutta,	100	
Constantinople,	100	
Gibraltar,	30	
New York,	522	140 cks.
Philadelphia,		280
St. John's,	50	80 kgs.
Philadelphia,	50	

Sheep Wash—

Belize,	2 cs.	£5
Buenos Ayres, 3 t. 14 c.		74

Saltcake—

Baltimore,	50 t. 6 c.	£88
Philadelphia,	369 8	727
Philadelphia,	28	81

Sheep Dip—

Algoa Bay, 2 t. 10 c.		£135
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Saltpetre—

Pernambuco,	5 t. 14 c. 1 q.	£128
Corinto,	1 6 2	40
Monte Video,	5 2	6
Porto Alegre,	10	11
Para,	10	11

Sulphur—

St. John's, N. B., 2 t. 10 c.		£18
Boston,	50 2	200
Halifax,	50 2	656
New York,	100 1	220
Boston,	100 2	500
Calcutta,	29 18 3 q.	442
Antwerp,	9 t. 4 c. 2 q.	£277
Rotterdam,	14 2	22

Sodium Borate—

Samsoun,	6 c.	£11
Malta,	6	10
Larnaco,	4 1 q.	7
Trieste,	1 t. 1	35
New York, 4	18 2	166
Samsoun,	6 1	11

Sodium Chloride—

Hamburg,	10 c.	£27
New York, 2 t. 10		137

Strontia—

Havre,	65 t. 6 c.	£459
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Sodium Nitrate—

Bari,	3 t. 2 c.	£35
Alicante,	1 6 2 q.	10
Almeria,	1 4 3	10

Tin Phosphate—

Calcutta,	5 c.	£33
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Tartaric Acid—

Montreal,	18 c.	£123
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Tar—

St. John's,	50 brls.	
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Zinc Muriate—

Bombay,	1 t. 2 c. 2 q.	£22
Calcutta,	16 cks.	139

Zinc Chlorate—

Rotterdam,	5 t. 8 c.	£36
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TYNE.

Week ending April 17th.

Alkali—

Amsterdam,	21 t. 7 c.	
Hamburg,	4 17	

Antimony—

Rotterdam,	10 t.	
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Alum—

Pernau,	1 t. 14 c.	
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Arsenic—

Barcelona,	5 t. 5 c.	
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Bleaching Powder—

Baltimore,	50 t. 5 c.	
Copenhagen,	103 14	
Christiania,	24 15	
Amsterdam,	59 6	
Gothenburg,	10 3	
Lisbon,	10 3	
Antwerp,	17 18	
Hamburg,	36 8	
Rotterdam,	1 9	
Copenhagen,	39 17	

Barytes—

Vienna,	5 c.	
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Caustic Soda—

Baltimore,	87 t. 1 c.	
Copenhagen,	2 7	
Barcelona,	6	
Vienna,	18 8	

Copperas—

Vienna,	17 c.	
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Hydrochloric Acid—

Pomaron,	17 c.	
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Litharge—

Antwerp,	5 c.	
Hamburg,	3 t. 1	
Copenhagen,	16	
Vienna,	1 1	

Manure—

Kalmit,		
Frederikshavn,	9 t. 16 c.	

Magnesia—

Vienna,	1 t. 1 c.	
Hamburg,	1 t. 7	

Nitric Acid—

Pomaron,	4 c.	
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Pitch—

Antwerp,	100 t.	
Svendsborg,	21 t. 18 c.	
Antwerp,	6 17	
Randers,	50 17	
Copenhagen,	2 1	

Soda Ash—

Christiania,	10 t.	
Gothenburg,	67 15 c.	
Baltimore,	50 7	
Copenhagen,	9 16	
Rotterdam,	13 14	

Sulphuric Acid—

Barcelona,	2 c.	
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Sodium Sulphate—

Copenhagen,	5 t. 8 c.	
Lisbon,	5 7	
Copenhagen,	5 13	

Superphosphate—

Esbjerg,	27 t. 10 c.	
Frederikshavn,	206 5	
Reval,	249 16	

Sodium Bicarbonate—

Rotterdam,	6 c.	
Tar—		
Pernau,	12 t. 4 c.	

HULL.

Week ending April 15th.

Bleaching Powder—

Rouen,	6 cks.	
Stettin,	56 60 kgs.	

Chemicals (otherwise undescribed)

Antwerp,	26 cs. 54 pks.	
Alexandria,	12 130 81 cks.	
Bombay,		25
Bergen,		20
Bremen,		6
Copenhagen,	6 7	
Christiania,	53 5	320 lbs.
Gothenburg,	138 9	45 cks.
Hamburg,		9
Konigsberg,		30
Rouen,		40
Stettin,	81 80	

Dyestuffs (otherwise undescribed)

Dunkirk,	100 bgs.	
Hamburg,	4 drms. 8 cks.	
Reval,		2

Manure—

Antwerp,	489 bgs.	
Dunkirk,	50	
Hamburg,	180 t.	
Stettin,	570 bgs.	
Ghent,	391	

Naphtha—

Melbourne,	35 drums.	
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Pitch—

Antwerp,	205 t.	
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Tar—

Christiania,	10 cks.	
Hamburg,	12	

GLASGOW.

Week ending April 17th.

Ammonium Sulphate—

Trinidad,	141 t. 16 1/2 c.	£1,806
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Chloride of Lime—

New York,	53 t. 16 1/2 c.	£391
	1,100	399

Copper Sulphate—

Bordeaux,	23 t. 17 c.	£440
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Dyestuffs—

Logwood		
Lisbon,		£244
		227

Fustic

Boston,	23 c.	£41
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Epsom Salts—

Christiania,	100 bgs.	£38
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Glucose—

Cape Colony,	5 t. 15 c.	£110
Bombay,	12 14 1/2	205

Manure—

Lisbon,	60 t.	£190
Trinidad,	51 19 1/2 c.	352

Pitch—

Christiania,	80 brls.	£15
Amsterdam,	212 t.	212
Bordeaux,	161 6 c.	160

Potassium Prussiate—

New York,	19 1/2 c.	£76
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Potassium Bichromate—

Rotterdam,	12 cks.	£174
New York,	165 c.	305
Lisbon,	102 1/2	193

Paraffin Wax—

Cape Colony,	3 t. 7 1/2 c.	£1
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PRICES CURRENT.

WEDNESDAY, APRIL 23, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

as stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

		£	s.	d.
5% and 40%	per cwt	7/6	12/9	
Alcali	"	67/6		
S.G., 2000°	"	0	12	9
82%	nett per lb.	0	0	6 1/2
"	"	0	0	3 1/2
(Tower Salts), 30° Tw.	per bottle	0	0	8
(Cylinder), 30° Tw.	"	0	2	11
" Tw.	per lb.	0	0	2
"	"	0	0	1 1/2
"	nett	0	0	4
"	"	0	1	2 1/2
c (fuming 50%)	per ton	15	10	0
(monohydrate)	"	5	10	0
(Pyrites, 168°)	"	3	2	6
" (150°)	"	1	8	0
(free from arsenic, 140/145°)	"	1	10	0
ous (solution)	"	2	15	0
pure)	per lb.	0	1	0 1/2
"	"	0	1	2 1/2
white powdered	per ton	13	0	0
se lump)	"	4	15	0
sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
"	per lb.	0	15	0
" 880=28°	per lb.	0	0	3
" =24°	"	0	0	1 1/2
Carbonate	nett	0	0	3 1/2
Muriate	per ton	23	0	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-	
Nitrate	per ton	40	0	0
Phosphate	per lb.	0	0	10 1/2
Sulphate (grey), London	per ton	11	7	6
" (grey), Hull	"	11	5	0
l (pure)	per lb.	0	0	11
lt "	"	0	0	9
"	per ton	75	0	0
(tartar emetic)	per lb.	0	1	1
golden sulphide)	"	0	0	10
chloride	per ton	8	0	0
arbonate (native)	"	3	15	0
lphate (native levigated)	"	45/-	to 75/-	
Powder, 35%	"	5	0	0
Liquor, 7%	"	2	10	0
of Carbon	"	13	0	0
Acetate (crystal	per lb.	0	0	6
chloride	per ton	2	2	6
r (at Runcorn) in bulk	"	17/6	to 35/-	
Dyes:—				
artificial) 20%	per lb.	0	0	9
"	"	0	3	9
Products				
ene, 30% A, f.o.b. London	per unit per cwt.	0	1	5
90% nominal	per gallon	0	3	5 1/2
50/90	"	0	2	7 1/2
Acid (crystallised 35°)	per lb.	0	0	9 1/2
" (crude 60°)	per gallon	0	2	3
" (ordinary)	"	0	0	2 1/2
" (filtered for Lucigen light)	"	0	0	3
aphtha 30% @ 120° C.	"	0	1	3
ils, 22° Tw.	per ton	3	0	0
b. Liverpool or Garston	"	1	8	0
Naphtha, 90% at 160°	per gallon	0	1	9
Oils (crude)	"	0	0	2 1/2
ili Bars)	per ton	48	7	6
phate	"	24	0	0
de (copper scales)	"	51	0	0
crude)	"	30	0	0
distilled S.G. 1250°)	"	55	0	0
"	nett, per oz.	8 1/2	d. to 9d.	
ate (copperas)	per ton	1	10	0
ide (antimony slag)	"	2	0	0
t) for cash	"	14	0	0
urge Flake (ex ship)	"	15	10	0
ate (white ")	"	23	10	0
" (brown ")	"	18	5	0
onate (white lead) pure	"	19	0	0
ate	"	22	0	0

Lime, Acetate (brown)	"	7	17	6
" (grey)	per ton	13	15	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	5	0
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	18	0	0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6	
" Ore, 70%	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	10
" Miscible, 60° O.P.	"	0	4	7 1/2
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	24	10	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5 1/2
" American	"	0	0	5 1/2
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	19	0	0
" Chlorate	per lb.	0	0	5
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85%	per ton	22	10	0
" " (Caustic Potash) 75/80%	"	21	10	0
" " (Caustic Potash) 70/75%	"	20	15	0
" Nitrate (refined)	per cwt.	1	2	6
" Permanganate	"	4	2	6
" Prussiate Yellow	per lb.	0	0	9 1/2
" Sulphate, 90%	per ton	9	10	0
" Muriate, 80%	"	7	15	0
Silver (metal)	per oz.	0	3	7 1/2
" Nitrate	"	0	2	5 1/2
Sodium (metal)	per lb.	0	0	4
" Carb. (refined Soda-ash) 48%	per ton	6	7	6
" " (Caustic Soda-ash) 48%	"	5	2	6
" " (Carb. Soda-ash) 48%	"	5	12	6
" " (Carb. Soda-ash) 58%	"	6	15	0
" " (Soda Crystals)	"	2	17	6
" Acetate (ex-ship)	"	15	15	0
" Arseniate, 45%	"	11	0	0
" Chlorate	per lb.	0	0	6 1/2
" Borate (Borax)	nett, per ton	30	0	0
" Bichromate	per lb.	0	0	3
" Hydrate (77% Caustic Soda)	per ton	12	0	0
" " (74% Caustic Soda)	"	11	0	0
" " (70% Caustic Soda)	"	9	7	6
" " (60% Caustic Soda, white)	"	8	12	6
" " (60% Caustic Soda, cream)	"	8	10	0
" Bicarbonate	"	6	0	0
" Hyposulphite	"	5	10	0
" Manganate, 25%	"	9	0	0
" Nitrate (95% ex-ship Liverpool)	per cwt.	0	8	0
" Nitrite, 98%	per ton	28	0	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7 1/2
" Silicate (glass)	per ton	5	7	6
" " (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40%	per cwt.	2	0	0
" Sulphate (Salt-cake)	per ton	1	5	0
" " (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98%	"	8	0	0
Sulphocyanide Ammonium, 95%	per lb.	0	0	8
" Barium, 95%	"	0	0	5 1/2
" Potassium	"	0	0	8
Sulphur (Flowers)	per ton	7	15	0
" (Roll Brimstone)	"	6	0	0
" Brimstone: Best Quality	"	4	5	0
Superphosphate of Lime (26%)	"	2	10	0
Tallow	"	25	10	0
Tin (English Ingots)	"	93	0	0
" Crystals	per lb.	0	0	6 1/2
Zinc (Spelter)	per ton	20	0	0
" Chloride (solution, 96° Tw.	"	6	0	0

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ON GULLIBILITY.

WE hasten to take an opportunity of exchanging ideas with our readers on this subject, because childlike faith and simple credulousness are so rapidly dying out under the exterminative influence of the School Board, that gullibility will soon become as extinct as the dodo, and dishonesty cease to exist for the simple reason that mankind will be too much on the alert to fall a prey to its wiles. But these halcyon days have not yet actually arrived. They may not be far off but the proceedings in our law courts shew us occasionally that specimens of the *genus* gull still survive. A case recently tried in the Stockport County Court, and reported elsewhere in these columns, throws some little light upon the progress of the evolutionary operation which is daily making man sharper than he used to be. As has often been the case before, the fertilizing phospho-guano only called into being the apple of discord, and as Messrs. S. and T. Rogerson, of Cheadle, had expected a crop of a different nature they sought a solatium for their disappointment from the administrator of the law. Perhaps this last proceeding is the one that most fully justifies these present remarks, but we prefer to leave it for the moment and deal with some other aspect of the case. It appears that the Manchester Phosphoguan Company sold the plaintiffs at the rate of 35s. per ton some of the residual matter left after bones had been treated for the extraction of phosphoric acid. Messrs. Rogerson, as their counsel explained to the court, were very chary over the purchase, as they knew that in the manure trade things are not always "what they seem." However, their knowledge availed them little, for the eloquence of the vendor secured an order. After having made the bargain the buyers, in their exceeding wisdom, had the stuff analysed, and their peace of mind was not promoted by a report from Dr. Voelcker that the manure was worthless. Its effect, too, upon the crop to which it was applied was absolutely *nil*. The scientific evidence was conflicting, and it appears to us that the truth lay somewhere between the opinions expressed by the well-known analysts who gave evidence. If this was so, probably Judge Hughes was not far wrong in coming to the conclusion that the market value of the manure was 17s. per ton.

But why did Messrs. Rogerson buy without guarantee an article which they had evidently regarded with a certain amount of suspicion? Or why did they not have it analysed before making the bargain? They belong to an Association, one of the main objects of which is to protect their interests under such circumstances as these, but although the best scientific aid was to their hand, they did not trouble to avail themselves of it. One cannot altogether blame the manufacturer for trying to get the highest price possible for his wares, and there is nothing to shew that in this case he did not honestly think he was giving a *quid pro quo*. The "good old days" of the manure maker are over. He can no longer grind up broken bricks and sell them at £10. per ton. He has to be circumspect in his ways and walk on the same fool path as other men.

Then another question arises. When buyer and seller found themselves at variance upon the value of the materi-

bought and sold, would it not have been a less costly and more satisfactory proceeding to have submitted the case to competent arbitration? If the services of an impartial expert had been called in—one in whom both parties had complete confidence—and he had been requested to give a report upon the value of the manure, based upon its chemical analysis, we fail to see where there could have been any necessity for taking the matter to the County Court at all.

CHESHIRE COUNTY COUNCIL.

POLLUTION OF THE IRWELL AND THE SHIP CANAL.

ONE of the chief items of business before the Cheshire County Council is the consideration of correspondence that has passed between the clerk and the Local Government Board with reference to the pollution of the rivers Irwell and Mersey and of the Manchester Ship Canal. The Local Government Board having requested the County Council to furnish them with the reasons on which they based their application for the creation of a joint committee representing all the administrative counties in the watershed of the Irwell and Mersey for enforcing the provisions of the Rivers Pollution Prevention Act, a draft reply has been prepared by the clerk to the County Council setting forth that the immediate reason for the petition is the imperative need that the water in the Manchester Ship Canal should be reasonably pure. The Cheshire County Council, in order to secure this, proposed that the area constituting the district should be the watershed of the Mersey and Irwell as far as the tideway at Warrington, this area including all the water flowing into the Ship Canal. The proposal of the Lancashire County Council dealt with the whole watershed of the Mersey and Irwell, which included not only the waters flowing into the Ship Canal, but also the tidal waters of the estuary of the Mersey; and for the purpose of preventing the pollution of the Ship Canal it was not necessary that these tidal waters of the Mersey should be included in the proposed district, as tidal waters might be safely left to themselves. The drainage of Warrington and of all places lower down the Mersey would not fall into the Canal but into the tidal waters of the Mersey. The area given in the Cheshire County Council map was a compact district, and, with the Ribble watershed which the Lancashire County Council was petitioning to have placed under another joint committee, would, roughly speaking, cover the whole of the cotton district. This cotton district it was of the utmost importance to treat in a uniform manner. The area proposed by the Lancashire County Council was unwieldy and unnecessary, including, for instance, the River Weaver, which drained a district apart from the salt trade purely agricultural. Birkenhead could not have identical interests with the cotton manufacturing districts; and, further, if the tidal waters of the Mersey were included within the proposed district, the joint committee exercising authority thereover might be brought into conflict with the Mersey Conservancy Commissioners and the River Weaver Trustees. The extension of the area, as proposed by the Lancashire County Council, did not seem to have any advantages, but it did seem to have great disadvantages. It was difficult to understand why the West Riding of Yorkshire should be included in the Lancashire scheme; and, further, if the River Weaver was included within such district, then Staffordshire must also be covered by the same authority. The Cheshire County Council desired to observe that for the purpose of securing the prevention of the pollution of the Manchester Ship Canal, the foregoing, among other reasons, pointed to the area shown upon the Cheshire map as being sufficient, and that there was no necessity for the enlarged district proposed by the Lancashire County Council. The area proposed by the Cheshire authority was the same as that described in the Mersey, &c., Protection Act, 1862, which prohibited the throwing of solid or bulky substances into the Mersey or Irwell, and their tributaries above Warrington bridge, without qualification as to preventing the flow or polluting the waters thereof.

A NEW USE OF GRAPHITE.—As a hint to blast furnace managers, the following account is given by *The Mechanical News* of a new use for graphite. An experiment was tried at the Crown Point Iron Company's Plant some time ago, on the occasion of their re-lining and starting in blast one of their large furnaces. After the fire-bricks were in place, a cheap article of graphite or plumbago was bought, reduced to a paste with water and the interior of the furnace washed with the plumbago paste. It gave a slippery glaze—incidental to the lubricating quality of plumbago—to the fire-brick lining, which lessened the time to a heat quite a percentage. The slippery surface to be slag or other refuse and the charge passed down in less time, being free and clear. The Crown Point managers claim for their scheme. The expense of the trial was very small, but the value of the result. The graphite used came from the Crucible Company, Jersey City, N. J.

FLUORINE.

WE have already given an account of some experiments of M. Moissan that permitted him to isolate fluorine. In these experiments he succeeded in splitting up hydrofluoric acid into hydrogen and fluorine. Having again taken up this study, he has been enabled to determine the constant physical principles of this new simple gaseous matter.

M. Moissan, in the first place, studied the question as to under what conditions platinum is attacked by fluorine gas. He found that at the ordinary temperature it was possible to preserve fluorine indefinitely in platinum apparatus without any fear of the metal being attacked. Moreover, he demonstrates that at a temperature of 500° or 600° there forms a bifluoride of platinum analogous to the already known chloride of the same metal. This new compound is important, since it possesses the curious property of splitting up into fluorine and platinum through heat. It is likely that when it becomes possible to prepare fluoride of platinum by an indirect way (in starting from hydrofluoric acid, for example), we shall have a chemical process for obtaining fluorine in large quantity.

After his preliminary experiments, M. Moissan took the density of fluorine. In order to obtain this gas in abundance, he modified his first apparatus by giving a much greater capacity. Beyond the electrolyzing tube he arranged a small platinum spiral, designed to condense the vapours of hydrofluoric acid carried along, and, finally, two platinum tubes filled with fluoride of sodium. This compound, in fact, retains the minutest traces of hydrofluoric acid.

The pure gas thus prepared is led into the density bottle by means of small flexible platinum tubes. This bottle is first weighed when full of air, and afterward when full of fluorine. Knowing its volume it is easy to determine the density of the fluorine therefrom. M. Moissan determined the figure 1.26, while the theoretical density is 1.31. The slight difference between these figures well shows that pure fluorine has a normal density.

M. Moissan next determined the colour of the gas. For this he used a platinum tube closed by transparent plates of fluorspar. Two platinum ajutages allowed the gas to enter and make its exit. When the tube was well filled with fluorine the gas, on escaping through one of the ajutages, ignited crystallised silicium at the ordinary temperature.

Observing the gas, then, through the plates of fluorspar, it was found that it had a greenish-yellow colour, and that the latter was paler than that of chlorine seen in the same volume. The colour, moreover, differs from that of chlorine in inclining more to yellow.

The spectrum of fluorine also was studied in detail. Upon this subject there had been nothing published except a work by M. Salet, who had compared the spectra of chloride and fluoride of silicium. M. Moissan caused a very strong induction spark to pass between gold or platinum rods in a small apparatus filled with fluorine. It is unnecessary to add that this small apparatus was itself of platinum, and that the spark could be seen through the transparent fluorspar.

On comparing the results obtained by this new method with those furnished by hydrofluoric acid, fluoride of silicium, trifluoride of phosphorus, and fluoride of carbon, M. Moissan has been enabled to demonstrate the existence of thirteen new lines, placed in the red part of the spectrum. These lines are found for the most part in the red portion comprised between the second line of potassium and the line of lithium, that is to say, in a part where no simple body has hitherto given lines. Finally, M. Moissan adds that with hydrofluoric acid he has obtained several bands in the yellow and the violet; but the position of these bands, which are not very well defined and are very wide, could not be exactly determined.

Comparing these researches with those undertaken by M. Meslam upon the fluorate ethers of the ethyl series, it will be seen that fluorine is clearly placed at the head of the chlorine family. It is coloured the same as all the compounds of this family, but not so deeply as chlorine. Its density is normal and the fluorate ethers have a boiling point less by about 50° than the corresponding chlorate ethers.

What renders these researches very curious is not only the interest attached to the isolation of the new simple matter that has been obstinately sought for for a century, but the fact that this gas is the most active matter that chemists possess. In fact, it ignites crystallised silicium, which boiling nitric acid does not attack, and which pure oxygen burns with difficulty at a high temperature; and, while chlorine is incapable of directly combining with carbon, fluorine is capable of uniting with it and forming a gaseous body—fluoride of carbon, which M. Moissan will soon describe.

Another experiment recently described further demonstrates the chemical activity of fluorine. When into the tube filled with fluorine that served to determine the colour of this gas a drop of water is allowed to fall, a decomposition of the water occurs and hydrofluoric acid forms, with a disengagement of ozone—the latter being of the characteristic blue tint that Messrs. Hautefeuille and Chapuis have demonstrated to belong to oxygen very rich in ozone. This is the sole chemical reaction that yields so concentrated ozone.

Finally, we may add that fluorine and hydrogen combine when cold and in darkness. This is the only example of two simple gaseous matters directly combining without the intervention of a foreign energy. Chlorine and hydrogen require light; hydrogen, and oxygen require an electric spark or a flame; hydrogen and fluorine combine directly.

Moreover, this chemical activity has been very demonstrated by Messrs. Berthelot and Moissan who have determined the heat of combination of hydrogen and fluorine to be 37.6 calories, that is to say it is greater than that of the hydroacids for iodine, bromine, and chlorine. Thus the fluorine is the most active element known at present, and on account of this very property, we maintain that it will be called upon to furnish chemists the most interesting reactions.—*La Nature*.

THE SPONTANEOUS IGNITION OF COAL CARGOES.

BY PROFESSOR VIVIAN B. LEWES, ASSOCIATE, F.C.S., F.I.C.

[Read at the Thirty-first Session of the Institution of Naval Architects, March 28th, 1890, the Earl of Ravensworth in the chair.]

(Continued from page 267.)

ON examining the evidence to be obtained as to the conditions under which spontaneous ignition of coal in ships usually takes place, it is found that liability to ignition increases with:—

(1) The increase in tonnage of cargoes.

Thus, in cargoes of under 500 tons the cases reported amount to a little under $\frac{1}{4}\%$ for shipments out of Europe; from 500 to 1,000 tons, to over 1%; from 1,000 to 1,500 tons, to 3.5%; 1,500 to 2,000 tons, to 4.5%; and over 2,000 tons, to no less than 9%.

The evidence demonstrating this very remarkable result is to be found in the Report of the Royal Commission for 1875, p. viii., and clearly shows the influence of mass upon this action which acts in two ways:—

(a) The larger the cargo, the more non-conducting material will there be between the spot at which heating is taking place and the cooling influence of the outer air.

(b) The larger the cargo the greater will be the breaking-down action of the impact of coal coming down the shoot upon the portions first loaded into the ship, and the larger, therefore, the fresh surface exposed to the action of the air.

(2) The ports to which shipments are made, 26,631 shipments to European ports in 1873 only resulting in 10 casualties, whilst 4,485 shipments to Asia, Africa, and America gave no less than 60.

This startling result is partly due to the length of time the cargo is in the vessel, the absorption and oxidation being a comparatively long action, but a far more active cause is the increase in the action brought about by the increase of temperature in the tropics, which converts a slow action into a rapid one, and if statistics had been taken, most of the ships would have been found to have developed active combustion somewhere about the neighbourhood of the Cape, the active action developed in the tropics having raised the temperature to the igniting point of the coal by that time.

(3) The kind of coal of which the cargo consists, some coals being specially liable to spontaneous heating and ignition.

This is a point on which great diversity of opinion exists, but I think it will be pretty generally admitted that cases of heating and ignition are more frequent in coals shipped from East Coast ports than in shipments of the South Wales coals. As has been pointed out, however, so much depends on the amount of small coal present that a well-loaded cargo of any coal would be safer than a cargo of Welsh steam coal in which a quantity of dust had been produced during loading.

The idea that the percentage of pyrites present is any indication of the liability to spontaneous combustion must be entirely discarded, as experiment shows that many coals poor in pyrites frequently ignite, whilst others rich in them are perfectly safe.

A much surer guide is to be found in the quantity of moisture present in an air-dried sample of coal, which is a sure index to the absorptive power, the higher the amount of moisture held by the coal after exposure for some time to dry air, the greater will be its power of absorption for oxygen, and the greater therefore its liability to spontaneous heating and ignition.

This is beautifully shown by the table on opposite page, in which the percentage of pyrites and moisture present in some coals are contrasted with their liability to self-ignition.

(4) The size of the coal, small coal being much more liable to spontaneous ignition than large.

This, as has been pointed out, being entirely due to the increase in active absorbent surface exposed to the air, a fact which is verified by the experience of large consumers of coal on land, gas managers recognising the fact that coal which has been stamped down or shaken down during storage being more liable to heat than if it has been more tenderly handled, the extra breakage causing the extra risk.

(5) Shipping coals rich in pyrites whilst wet.

Liability to Spontaneous Ignition.	Pyrites per cent.	Moisture per cent.
Very slight.....	$\left\{ \begin{array}{l} 1.13 \\ 1.01 \text{ to } 3.04 \\ 1.51 \end{array} \right.$	$\left\{ \begin{array}{l} 2.54 \\ 2.75 \\ 3.90 \end{array} \right.$
Medium.....	$\left\{ \begin{array}{l} 1.20 \\ 1.08 \\ 1.15 \end{array} \right.$	$\left\{ \begin{array}{l} 4.50 \\ 4.55 \\ 4.75 \end{array} \right.$
Great.....	$\left\{ \begin{array}{l} 1.12 \\ 0.83 \\ 0.84 \\ 1.00 \end{array} \right.$	$\left\{ \begin{array}{l} 4.85 \\ 5.30 \\ 5.52 \\ 9.01 \end{array} \right.$

The effect of external wetting on coal is to retard at first the absorption of oxygen and so to check the action; but it also increases the rate of oxidation of the pyrites, and so causes disintegration of the coal, with consequent crumbling and heating due to exposure of fresh dry surfaces.

(6) Ventilation of the cargo.

The so-called ventilation, which has from time to time been introduced into coal ships, is undoubtedly one of the most prolific causes of spontaneous ignition.

For ventilation to do any good cool air would have to sweep continuously and freely through every part of the cargo, a condition impossible to attain, whilst anything short of that only increases the danger, the ordinary methods of ventilation supplying just about the right amount of air to create the maximum amount of heating. The reason of this is clear. A steam coal absorbs about twice its own volume of oxygen, and takes about ten days to do it under favourable conditions, and it is this oxygen which in the next phase of the action enters into chemical combination and causes the serious heating.

A ton of steam coal occupies 42 to 43 cubic feet, and if properly loaded contains between the lumps as nearly as possible 12 cubic feet of air space, that is to say, of the 42 cubic feet, 12 cubic feet is air and 30 cubic feet is coal.

Thirty cubic feet of coal, with its fresh absorbing surfaces laid bare by the crushing incidental to loading, will, in the first ten days after being taken on board, absorb 60 cubic feet of oxygen, if it can get it. Now, air contains only, roughly, one-fifth of its volume of oxygen, so that 60 cubic feet represent 300 cubic feet of air, or twenty-five times as much as is present; so that it is evident that if air could be excluded there would be only one-twenty-fifth the quantity of oxygen present which is needed for complete action, and any heating would in consequence, be very slight; whilst to produce the greatest heating it would be necessary to change the entire air in the cargo twenty-five times in the first ten days, and this is just about what the ordinary method of taking a box shaft along the keelson with Ventian lattice upshafts from it would give.

The most forcible illustration of the evil of such ventilation is to be found in the case of the four colliers, "Euxine," "Oliver Cromwell," "Calcutta," and "Corah," which were loaded at Newcastle under the same tips, at the same time, with the same coal, from the same seam. The first three were bound for Aden, and were all ventilated. The "Corah" was bound for Bombay, and was not ventilated. The three thoroughly ventilated ships were totally lost from spontaneous ignition of their cargo, while the "Corah" reached Bombay in perfect safety.

(7) Rise in temperature in steam colliers due to the introduction of triple expansion engines and high-pressure boilers.

It has been fully pointed out that anything which tends to increase of initial temperature increases the rapidity of chemical action. Steam at 80 lbs. boiler pressure has a temperature of 324° F. (162° C.), and a common stoke-hold temperature with boilers worked at this pressure is 100° to 130° F. (or 38° to 54° C.). Steam at a boiler pressure of 155 lbs. has a temperature of 368° F. or 186° C., and gives a corresponding increase of temperature in the stoke-hold and other adjacent portions of the vessel, the temperature in the stoke-hold under these conditions being from 110° F. (43.5° C.) to 140° F. (60°), an increase of about 10° F.

It is, however, difficult in the mercantile marine to get a direct comparison of the increase in temperature due to this cause, but in the service some of the troopships have been from time to time refitted and in the case of the "Malabar" and "Crocodile," the temperatures existing with the old simple low-pressure engines, the old compound engines, and the new triple expansion engines can be contrasted and will be found in the accompanying table, for which I am indebted to Mr. White.

From this it will be seen that, taking the voyage through, the average increase of temperature in the stoke-hold from the use of the triple expansion engines is about 5°. This table is of great interest, as the temperatures taken during the outward voyage of the "Crocodile," December, 1883, point to the coals in the bunkers commencing to heat and also illustrate where and at what temperature it commenced.

most powerful cooling agent, an instantaneous quencher of fire, and would prevent any further tendency to heat on the part of the coal treated with it.

If carbonic acid gas is compressed under a pressure of 36 atmospheres at a temperature of 32° F. (0° C.), it is condensed to the liquid state, and can be obtained in steel vessels, closed with screw valves. On opening the valve some of the liquid is ejected into the air, and on coming into the ordinary atmospheric pressure, is in a moment converted into a large volume of gas. Conversion from the liquid to the gaseous state means the absorption of a large amount of heat, and so great is this that everything near the stream of new-born gas is cooled down, and some of the escaping liquid is frozen to a solid, having a temperature of -78° C., or -108.4 F.

This liquid carbonic acid gas is now extensively manufactured, and is used abroad to a large extent for aerating waters, driving torpedoes, and for freezing machines; and I should suggest its use in the following way for the checking of ignition in the coal cargo:—

The nozzle attached to the screw-valve on the bottle of condensed gas would have a short metal-nose-piece screwed on to it, the tube in which would be cast in solid, with an alloy of tin, lead, bismuth, and cadmium, which can be so made as to melt at exactly 200° F. (93° C.). The valve would then be opened, and the steel bottle buried in the coal during the process of loading. The temperature at which the fusible metal plug will melt is well above the temperature which could be reached by any legitimate cause, and would mean that active heating was going on in the coal; and under these conditions the pressure in the steel cylinder would have reached something like 1700 lbs., and the moment the plug melted the whole contents of the bottle would be blown out of it into the surrounding coal, producing a large zone of intense cold, and cooling the whole of the surrounding mass to a comparatively low temperature. The action, moreover, would not stop here, as the cold, heavy gas would remain for some time in contact with the coal, diffusion taking place but slowly through the small exit pipe.

When coal has absorbed as much oxygen as it can, it still retains the power of absorbing a considerable volume of carbonic acid gas; and when coal has heated, and then been rapidly quenched, the amount of gas so absorbed is very large indeed, and the inert gas so taken up remains in the power of the coal, and prevents any further tendency to heating; indeed, a coal which has once heated, if only to a slight degree, and has then cooled down, is perfectly harmless, and will not heat a second time. It is not by any means necessary to replace the whole of the air in the interstices of the coal with the gas, as a long series of experiments show that 60 per cent. of carbonic acid gas prevents the ignition of the most pyrophoric substances.

One hundred cubic feet of gas can be condensed in the liquid state in a steel cylinder 1 foot long and 3 inches diameter, and it has been shown that a ton of coal contains air spaces equal to about 12 cubic feet; therefore, one of these cylinders would have to be put in for every 8 tons of coal, and these would be distributed evenly throughout the cargo, and near the alarm thermometers, which would be set to ring a degree or two below the point at which the fusible plug would melt.

The bell ringing in the captain's room would warn him that heating was taking place, and the bell would continue to ring until the cylinder had discharged its contents, and had cooled down to a safe degree, so that the whole arrangement would be purely automatic, and yet the officers would know if everything was safe.

This liquid is now being made at a comparatively cheap rate, and with any demand for it machinery could be put up at the principal coaling ports to charge empty cylinders at a very low rate, so that the initial cost of the steel cylinders once got over the expenses would not be worth considering, more especially as one, or two at most, would be likely to go off.

If the precautions advocated were taken no danger could arise until the arrival of the ship at her destination, and the commonest precautions would then suffice. On removing the hatches, no naked light must be allowed near them, and no one must be allowed to descend into the hold until all the gases have had time to diffuse out into air. If the cylinders have gone off there will be but little fear of explosion, as a high percentage of the carbonic acid gas lowers the explosive power which the mixture of marsh gas (given off from some coals) and air possess; but the carbonic acid gas would overcome and suffocate a man descending into an atmosphere containing any considerable percentage of it. When a safety lamp, lowered into the hold continues to burn as brightly as it did in the open air, then it is perfectly safe to descend.

When once coal in a cargo has fired, pumping in water is of practically no use, as the fire is, as a rule, near the bottom of the mass of coal, and the flow of water is so impeded, that in percolating through the interstices of the heated coal, it is converted into steam before it can reach the seat of combustion. The most effective way to apply water would be to have four 3-inch pipes laid along the floor of the coal compartments, about 6 feet apart, these tubes having a ¼-inch

hole bored in the upper side every foot or so, and each pair of pipes coming through the bulk-head, and connecting one to two 6-inch pipes passing through the side of the vessel, the sea water being prevented from entering by means of screw valves. As soon as the alarm thermometer gave notice that heating had reached a dangerous point, these valves could be opened and the lower portion of the cargo drenched with salt water. This, evaporating rapidly, would give large volumes of water vapour, which, passing up through the heated coal, would lower its temperature, but would not be nearly as effective as the method before advocated. It might, however, be used in conjunction with that method, and would, in many cases, save the carbonic acid gas.

The question of preventing the heating and ignition of stores of coal on land and ready for use in bunkers, cannot be met so well by the use of the liquid gas, and, in these cases, it would be found beneficial to dress the coals with a little tar or tar oil, which would close the pores, and to a great extent prevent oxidation. I believe this was advocated by Lachman about 1870.

Crude petroleum in small quantities for this purpose would also be found valuable, for, as already shown, it has no tendency to oxidise itself, and lowers the tendency in other bodies, besides coating them, and so preventing access of oxygen.

The labour trouble in the coal trade is hampering all branches of industry, and, with increasing difficulty in obtaining coal, all sorts of rubbish will be shipped, and many a cargo of coal will go out during the next few months which, under normal conditions, would never have been allowed on board; and we may expect a heavy increase in the loss of life and property from spontaneous ignition. This will probably result in a rise in the rate of premium, and further check to our export coal trade; and I sincerely trust that, should these gloomy forebodings be fulfilled, the suggestions made in this paper, and based on experimental facts, may be found of value.

In conclusion, I wish to acknowledge my indebtedness to the researches of Dr. Richters, whose papers on the weathering of coal are to be found in Dingler's *Polytechnisches Journal* for 1870; to the report of the Royal Commissioners on this question in 1876, and finally, to Mr. Martell for suggesting the subject of this paper.

PHOSGUANO.

COUNTY COURT ACTION.

HIS Honour Judge Hughes was engaged last Friday at the Stockport County Court for several hours hearing a case, in the result of which the farmers of the district appear to take a lively interest, as evidenced by the large number who patiently waited through its hearing. It was one in which Messrs. S. and T. Rogerson farmers, of Heathside, Cheadle, sued George Henry Holden, trading as the Manchester Phosguano Company, of 41, Corporation-street, Manchester, manure manufacturers, for £4. 4s. 9d., as damages for breach of contract. Mr. R. Brown, solicitor, Stockport, appeared for the plaintiffs, and Mr. T. R. Sutton, barrister, Manchester, for the defendant.

Mr. Brown said in the spring of last year Messrs. Rogerson were waited upon by a Mr. Smith, who was a representative of the defendant. He informed them that he was in a position to supply them with a quantity of bone phosphate manure at a very cheap rate. The conversation took this form. Smith represented that his employer had a very large quantity of bone phosphate manure which was lying at their works somewhere in the neighbourhood of Manchester, which had been condemned by the local authority. This they were bound to get rid of, and were prepared to sell the manure at a great sacrifice. Mr. Rogerson, as a practical farmer, knowing very well that there were all kinds of worthless materials in the market, and that people went round to farmers with it, was very careful in his enquiries as to what this material was. Smith represented that he had already sold to Mr. Booth, who was one of the largest farmers in the district, a quantity of the same stuff and that it had proved successful. Mr. Rogerson subsequently said, "I generally use nitrate of soda, but upon your representation I will buy some of your manure." Smith added that the material was fairly worth £3 10s. per ton, but he would sell it to Mr. Rogerson at 35s. per ton. Mr. Rogerson, thinking it would be valuable and suitable for that year's crop, gave an order for three tons. It was laid at the same time as was a quantity of nitrate of soda, but there were places left where nothing was sown at all. The result of the bone phosphate was nil, while the nitrate of soda produced excellent results. Mr. Rogerson, seeing the results, went over to the offices of the firm on May 3rd, and saw one of the representatives of the defendant there. He told him the condition of the manure, and also said he was going to have a portion of it analysed, and intended sending it to Dr. Voelcker, of London, that gentleman being the analyst to the Royal Agricultural Society, of which society Mr. Rogerson happened to be a member. All members of the society were entitled to send two samples of manure, &c., to him for analysis at a very small cost. The reply of the analyst was to the effect that the phosphate was unfit for

was refuse material which he would not have advised Mr. Rogerson, on May 27th, sent a letter to the farmer, asking him what the reply of the doctor was, and what he intended doing in the matter. In his reply he said he should certainly insist upon payment. Mr. Rogerson wrote back to the effect that whereas the manure which had been applied produced very satisfactory results, the manure was not successful in the least. Continuing, he said the tale made out by Smith that it was necessary to get phosphate in a few days because it had been condemned by the judge, was not exactly true. The material was manufactured by Esilman, who was engaged in extracting phosphoric acids. He got all the phosphoric acids or phosphate which he could from the bones, after which he threw away the latter as useless. This very heap of Esilman's which was purchased by a farmer on behalf of the defendants at 6d. per ton. They were bought at 6d. per ton and sold it at 35s. if they liked. Having been sown and the results being nil, Mr. Rogerson refused to pay by the defendants for payment, but he was never sued. He used this fertilizer for that year's crop, but the result was in the land where this manure was sown as the other upon had been sown. He trusted to Smith's warranty that it was a fertilizer for crops, but as it proved not to be the claim for which he had sustained thereby constituted the present case. In conclusion, Mr. Brown said what was really sold to the farmer was gypsum, which was nothing more nor less than what Brown then called a number of witnesses to support it, the first being Mr. James Rogerson, who said that he had 100 acres in extent. In reply to Mr. Sutton he said he had paid 6s. per ton for nitrate of soda, but where he put 6 cwt. of nitrate on an acre of land he only used 1½ cwt. of nitrate of the same space. The latter cost about 12s. and the former 18s. Before the court adjourned for luncheon Mr. Brown said that he had no cases. In the present one neither plaintiff nor defendant had an analyst; but in the second the sample had been analysed. It was therefore desirable that they should get on to the second case that afternoon. Mr. Sutton thought it was a pity that the first case had not been taken first. The Judge: I will sit at 10 o'clock on the second case is finished. I suppose that will be about 12 o'clock. The other witnesses called were Mr. Rogerson, farmer, of Handforth; John Henry Booth, of Dairy House Farm, Handforth; John Thompson, of Manchester, chemist and public analyst for who said that the material was not phosphate at all; it was of lime, and was not worth putting on land, because the land contained could be found in almost any soil. There was a blue in it, which was a poison to plants. Mr. Sutton had addressed the Court at some length for the first time. Charles Estcourt, Mr. Philip Escourt, and Mr. Spencer, of Manchester and district, were called. All of these had analysed the manure to analyse, and found it very good as a

adjournment his honour said that, carefully weighing the evidence of the analytical chemists on both sides, he came to the conclusion that the value of the manure was 17s. per ton, as against 35s. charged, and he found for the plaintiffs for £2. 19s. 3d. in breach of contract, with costs. As other actions had been pending, he was awaiting the issue of this suit he would grant an adjournment until the parties could agree upon a case.

A number of farmers interested in the case, viz:—Thos. Brown, of Old Hall Farm, Woodford, who sues the Phosguano Co. for £7. 18s. 6d.; Isaac Leah, farmer, of Gill Bent, Cheadle, who sues for £5. 19s.; and Isaac D. Burrows, also of Cheadle, who sues for £6. 6s.

INSULATOR.—We understand that Dr. Purcell Taylor has, after considerable trouble, succeeded in obtaining a new insulating material having a higher dielectric resistance than gutta-percha, at about one-tenth of the cost of the latter substance. The new material may be made either rigid or flexible, and to melt at any desired temperature. It is claimed that it is very tough and tenacious. **INVENTION FOR THE MANAGEMENT OF STEAM ENGINES AND BOILERS.**—A Bill introduced into Parliament by the following labour representatives: Fenwick, Pickard, Broadhurst, Wm. Crawford, and others, provides for certificates to persons in charge of steam engines, on land. Every person who before January 1st, 1891, has obtained a certificate of control or management for a period of not less than one year, or a steam-engine exceeding five-horse power, or steam engine on a closed vessel for the generation of steam for such engine, railway or manufactory in the United Kingdom, or on a coasting steamer of like power or pressure, shall be entitled to the service of delivery to him by the Board of Trade of a copy of the certificate that he has had such experience, and is a person of general good conduct.

USES AND VALUE OF ASBESTOS.

IN a recent paper Prof. J. Donald, M.A., of Montreal, states that the asbestos of commerce is the product of two widely separated countries—Italy and Canada. The Italian article was first in the market, but the Canadian product soon made for itself a place and a name, and the mineral is now shipped from Canada to Italy; while toward the close of 1889 the United Asbestos Company, Limited, of London, which controls the mines of Italy, acquired property in the Canadian field, and is equipping the same with a complete plant preparatory to operations on a large scale. It is very evident, then, that the Canadian fibre is, to say the least, no mean factor in the asbestos industry.

The various names by which this mineral is known are as follows:—The French Canadians call it *pierre a coton*—i.e., cotton-stone; the Germans speak of it as *steinflachs*—stone-flax; *amianto*, the Italian name, indicates that which is undefiled, in allusion to the fact that it may be cleansed by fire; and asbestos, the name by which it is generally known, is a Greek word, signifying endless, ceaseless, and points to its fire-resisting properties.

Prof. Donald's recent analysis of some Canadian asbestos showed the following results:—

Magnesia	40.07
Silica	39.05
Water	14.48
Alumina	3.69
Oxide of Iron	2.41
Undetermined	.30

Total..... 100.00

Most, if not all, the asbestos of commerce is classified as "fibrous serpentine," from the fact that the mineral occurs principally in a fibrous form, the fibres being so fine and flexible that they may be spun and woven as cotton and flax are; and, moreover, the fabric so obtained is capable of resisting a very high temperature. Some varieties are said to have resisted a temperature of 5,000° F. It is noted, however, that although asbestos is incapable of being fused, except at extraordinarily great heat, its fibres lose their flexibility and become brittle at a temperature only sufficiently high to deprive it of the water that is found in its composition. Altogether, it is a singular mineral, but one that is gradually coming into common use in a variety of forms suited to a great many purposes.

"Not only does our mineral resist high temperatures," says Prof. Donald, "but it is also proof against the action of the majority of chemicals. It therefore forms a very valuable substance for use in filtering apparatus, especially where acid and alkaline liquids, which corrode ordinary filtering paper and cloth, have to be dealt with. As a filtering medium it is used not only in chemical laboratories, but in manufacturing establishments as well."

At Salt Lake City, Utah, the Wyoming asbestos has been sold for about 80 dols. per ton. When the assorted mineral is woven into cloth its market value is about 300 dols. a ton.

Its uses are numerous. For roofing it is deemed the best known material. It is used also extensively in steam packing, while for boiler felting it has no equal. In printing and writing paper its indestructible qualities make it invaluable for documents that need to be preserved. As wall paper it aids in rendering a building fire-proof. In the form of rope it becomes available as fire-escapes and fire-resistant supports. Stokers and furnace-men use it for serviceable gloves, and full suits of clothing, including stockings, are already made of it, as are salvage blankets for rescuing goods from burning buildings. It can, indeed, be almost universally adopted; for mail bags, theatre curtains, drapery and dresses. Its non-conducting properties also commend it highly for application in connection with steam engines and boilers, for packing pistons, flange joints, hot-air joints, cylinder heads, and similar purposes—in the form of yarn, or rope, or felt—the latter making a non-conducting covering for steam pipes, and furnished in sections to fit any size of pipe and into rolls and sheets for large surfaces.

A lower grade of asbestos is less fibrous, more resembling gypsum, and this, when ground finely, becomes the basis of an excellent fire-proof paint.—*Exchange.*

THE ELECTRICAL DEMAND FOR COPPER.—One of the principal items entering into the manufacture of electrical apparatus and goods is copper. Perhaps a better appreciation than generally obtains of this fact may be formed from the statement which we heard last week, and is true, that one of the large companies had just placed an order for 1,000,000 pounds of copper, and had at that time an order in for 250,000 pounds more. Enormous as this quantity may seem, it is understood that it will all be used up by July 1st. The activity prevailing may readily be inferred from these figures, which are those of a single concern, though of course it is one of the most prominent.—*Electrical Engineer.*

BI-CARBONATE OF SODA FOR CARBONIC ACID GAS.

A WELL-KNOWN Liverpool firm of aerated water manufacturers states, as a result of their experience, that the use of bi-carbonate of soda is far preferable to and very much cheaper than the whiting process, says *The Mineral Water Trades' Recorder*. The firm has given much attention to the production of carbonic acid gas, which has hitherto been almost invariably made from carbonate of lime or whiting. As a result of perfectly reliable and frequently repeated experiments it has, however, been found that by the bi-carbonate of soda process a cheaper and better carbonic acid gas is obtained—a gas chemically pure and rich, as is seen in champagne wine. The difference in quality of the two gases may be demonstrated by a simple experiment. Put some bi-carbonate of soda in one glass, and some whiting in another; pour into each a small quantity of water; add a few drops of sulphuric acid, when effervescence will at once take place and carbonic acid gas will be generated. On smelling at each in turn it will be found that the gas in the vessel containing whiting emits an offensive smell, while that generated in the bi-carbonate of soda will be found to be perfectly inodorous. The purity of the gas made from bi-carbonate of soda tells in its favour as compared with that made from whiting. Then as to the cost, the firm in question have clearly demonstrated to our representative, when he called upon them, that the carbonic acid gas manufactured by means of bi-carbonate of soda is not only beyond comparison purer, but it is also very much cheaper. Experiments have been made as to the cost of one ton of carbonic acid gas, the prices of sulphuric acid being £6. per ton, of bi-carbonate of soda £5. per ton, and of whiting £1. 10s. per ton. By the bi-carbonate process the cost would be £16. 12s., made up of two tons of bi-carbonate of soda and one ton two cwt. of sulphuric acid. By the whiting process the cost would be £22. 10s., made up of three tons of whiting and three tons of sulphuric acid. The difference in favour of the former process is thus seen to be no less than £5. 18s. per ton. In addition to this, by the bi-carbonate process glauber-salts to the value of £4. 19s. are obtained. Deducting the cost of manufacture and packing—£1. 17s. 6d., there is a balance remaining of £2. 16s. 6d., which, added to the difference in favour of bi-carbonate process—£5. 18s., represents a total saving for the ton of carbonic acid gas manufactured of £8. 14s. 6d. This will, indeed, be a matter of great consideration in the future to mineral water manufacturers.

INCREASING CONSUMPTION OF NAPHTHALINE.

THE extreme scarcity and high price of camphor has raised into prominence an industry which only a few years ago was one of the most uncertain and unimportant known in the chemical world. About four years ago all the refined naphthaline used in this country (and the quantity was insignificant), was imported from Europe. The field presented by the consumption of this product of modern chemistry was so limited as to be almost overlooked by American enterprise. Two or three firms saw enough in it to add the production of naphthaline to their other business, and from this unimportant beginning has grown up an extensive and valuable industry. While there has been no increase in the number of producers since the output of this chemical began to assume important proportions in this country, the production has reached what may be considered very large proportions. It is stated that only three years ago the annual consumption in the United States did not exceed twenty tons, while for the current year the consumption, it is estimated, will reach at least five hundred tons.

The sudden and unprecedented growth of demand is due largely if not entirely to the extraordinary advance in the price of camphor and the impossibility of obtaining adequate supplies of that gum. The manufacturers were not prepared for this enlargement of the demand, and they were caught with insufficient facilities for turning out naphthaline as fast as wanted by the trade. The result is that the three producers have booked more orders than they can fill for the next three months and as the demand in Europe has increased in the same ratio there is little or nothing there that can be spared for this market. Naphthaline is produced in several forms, the more saleable being balls, tablets, scales, and granulated. The first named is more popular than the other kinds and the demand for this description has been so large that at the present time there is none to be had either here or abroad, except possibly from second hands at enhanced prices.

It is only a question of enlarging present producing facilities to furnish a practically unlimited supply of all grades, but the industry is yet so young, and its future so uncertain, that those engaged in it are not prepared to increase their expenses to the extent necessary to accommodate the output to the requirements of consumption.

The effect of the increased consumption is shown by the advance market values. Before the present movement began, three and quarter cents per pound was considered a fair average price. At present time the average quotation for the cheapest grade is five cents per pound, and the market has a decided upward tendency, owing to the small available supply here or abroad. The difficulty is to supply the immediate wants of consumers. The manufacturers can offer plenty of goods for delivery after June, but as by that time the consuming season would have ended, buyers do not care to make contracts so far ahead, particularly as they would, in carrying the stock over to the next season, have to stand a loss in weight from evaporation, and deterioration in the colour of the stock from atmospheric influences that might render it unsaleable.

So far this country has not been able to supply a sufficient quantity of crude naphthaline to meet the needs of consumption, partly because enough attention has not been given to the subject by those who are in a position to most profit by producing the chemical, but more particularly because our coal is not as rich in naphthaline as the European varieties. Consequently for some time to come at least market prices here will be influenced to a considerable extent by the conditions prevailing in Europe from whence the bulk of our supply of the crude article will still be drawn.

While naphthaline has come into prominence during the past year as a substitute for camphor in the preservation of woollens, furs, and other articles from the destructiveness of insects it has other uses. Among these may be mentioned its recent application to carburetting gas, disinfecting purposes, and its more ancient use in medicine. In all these fields its usefulness is extending, and there is every reason to suppose that it has become a fixed important article of commerce, and that as such its market value will become established on a highly profitable basis.—*Oil, Paint, and Drug Reporter*.

NEW METHOD OF TREATING ORES.

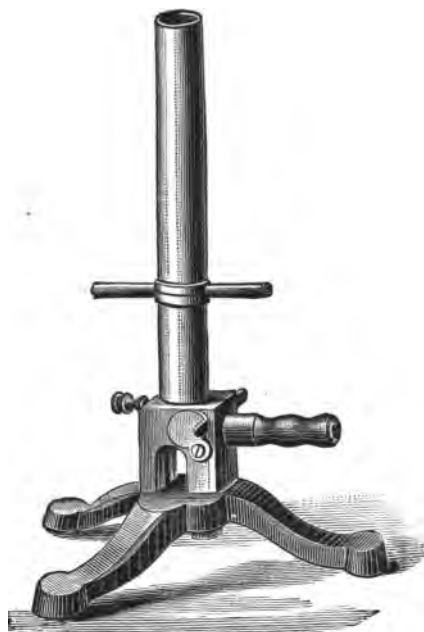
MR. R. J. W. POUND has taken out protection in Victoria for a method of separating metals from their matrices, as well as for raising the ores from mines. A sensational experiment was made at the offices of the Australian Ventilating Company, Little Bourke-street, Melbourne, on December 9th, when, in the presence of a number of experts and others interested in mining pursuits, Mr. Pound showed the results of his method of separation. A piece of stone, containing (by analysis) gold, silver, and copper, was broken into several pieces, one of which was pulverised in a mortar, and the stuff produced by Mr. Pound into an airtight room, his imperative instructions being to liberate him in seven and a half minutes. At the expiration of time the door was opened, when Mr. Pound was discovered in a condition of insensibility, but he quickly recovered on being taken one of the cooling rooms of the establishment. On regaining consciousness he immediately returned to the now comparatively vacant apartment in which he had conducted his operations, and in the space of a few minutes reappeared with a small quantity of each of the metals that had been contained in the stone. The process had been carried out under conditions inimical to animal life, but with mechanical arrangements no one need be in the chemically vapoury atmosphere. But Mr. Pound's scheme includes also the raising of ores by means of containers upon vertical railways. When thus the stone will be crushed three times. After the second crushing the ore is carried by compressed air action and delivered between two wheels, whence it will be caught by two intersecting steel wheels, thus generating heat to about 80 or 85°. After this the chemical comes into operation. The crushed and heated ore is pushed into a steel chamber into a battery, where all the "binding properties" are neutralised, allowing the gold, silver, and other metallic substances together with the residuum, to be passed on in semi-separate containers through a copper chamber to a battery for final treatment. If gold, silver, and copper are to be extracted and delivered in containers, the balance of the ore substance passing off through Mr. Pound claims that the ore can be treated at the cost (including raising from the slopes) of about 3s. per ton.—*American Manufacturer*.

RESTRICTING THE USE OF SACCHARIN.—The Portuguese government has decreed that saccharin, whether alone or mixed with other product, shall be sold by chemists only on the prescription of a legally qualified medical man. Every contravention of this enactment as well as the employment of saccharin in the manufacture of meats and drinks, is made punishable by definite penalties.

A NEW VINE MANURE.—M. Ville, a professor of chemistry at Paris, states that he has discovered a new chemical manure and almost miraculous in its effects on the vine. It consists of a mixture of phosphate of lime, carbonate of potash, and slaked lime, which, if placed round vine-growths, will enable them to withstand the onslaughts of the phylloxera.

NT REGULATING BUNSEN BURNER.

er, which is applied by John J. Griffin & Sons, Limited, is unique, as by a novel and ingenious arrangement, with the central gas jet as used in all other burners, and by one single movement regulates simultaneously the gas and the air. The gas passes into the burner tube through the side of the tube, which is therefore open from top to bottom consequently cannot become choked. The burner consists of 3 pieces only, which can be very easily and taken apart or put together, without the use of tools, even if used for prolonged use, as the various parts fit together perfectly.



Adjustable discs are provided at the side of the air inlets, to regulate the inflow of air under varying gas pressures. The advantage is that as the tube is open from top to bottom the chance of the jet becoming choked is avoided. The burner contains a powerful power of adjustment to suit all pressures, and is supplied at all costs.

PHOTOMETRIC METHOD OF ESTIMATING TANNIN IN BARKS, ETC.

BY SAMUEL J. HINSDALE, FAYETTEVILLE.

1. 0.04 gramme potassic ferricyanide in 500 cubic centimetres of water, and add to it 1.5 cubic centimetres (about 22 drops) of ferri chloridi. Call this iron mixture.

2. 0.04 gramme "pure" tannin (galotannic acid), which has been dried at 212°F., in 500 cubic centimetres of water. Call this tannin solution.

3. 8 gramme oak bark with boiling water, and make it up to 500 cubic centimetres with cold water.

4. 2-ounce clear glass tumblers (or beaker glasses) on a white surface, in one of them, with a dropping pipette (about 4 inches long, 1 inch wide) about half filled, put five drops of the infusion of oak bark in the others, with the same pipette (after rinsing), put five, six, seven, and eight drops of the "tannin solution" (the infusion and of the tannin solution must be uniform. The use of a pipette, about half filled, insures that).

5. Add to each 5 cubic centimetres of "iron mixture," and in addition add to each tumbler about 20 cubic centimetres of water. Within three minutes observe the shades of colour. The drops of "tannin solution" used in the tumbler which shows the shade of colour to the tumbler containing the infusion of oak bark gives the percentage of tannin in the bark, i.e., if it is the case that seven drops were placed, the tannin strength of the bark is 7%.

6. To observe the shades of colour horizontally rather than vertically, hold up the infusion tumbler, with the one which

most nearly corresponds, opposite to a white wall, with your back to the light.

The above is written for oak bark, but the same process will answer for any substance containing less than 10 % of tannin. The results are necessarily in terms for commercial gallotannic acid, and not in terms of pure tannin or of the particular tannin in the material assayed.

For substances containing between about 10 and 20 % it is best to dilute the infusion with an equal part of water and proceed as above, using five drops of the dilute infusion, and for the answer double the result. Thus, if the diluted infusion of tea required eight drops of "tannin solution" to correspond, call the percentage 16.

For substances containing less than 1 or 1½ %, exhaust 8 grammes instead of 0.8 gramme, and take one-tenth of the result for the answer. For substances containing more than 20 %, as galls, sumach, catechu, etc., you may dilute the infusion with two, three, or more times its bulk with water, and calculate as above (as with tea), or you may use one, two, three, or four drops of the undiluted infusion in the first glass and make the calculation thus, i.e.: As the number of drops of infusion used is to the number of drops "tannin solution" used (to correspond), so is five to the answer, thus: Suppose two drops infusion were used and the corresponding tumbler contained 15 drops tannin solution—2 : 15 :: 5 : answer 37.5 %.

The object in diluting the infusions is because the infusion glass may be of too deep a blue shade. It is better that it should just produce a light blue.

The tumblers must be perfectly clear and clean.

The "iron mixture," "tannin solution," and infusion must be freshly prepared and not exposed to the rays of the sun.

The water used must be free of iron and tannin.

Brit. and Col. Druggist.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

A NEW LUBRICANT.—A new mineral oil, as thick as butter, has been introduced as a lubricator by the Compagnie Française de Graisses Minérales Consistantes. It is stated to be free from acid, resin, or drying oils, and does not alter with exposure to the air. Its melting point is 84° C., and it does not inflame at a lower temperature than 220° C. While it resembles butter in colour it is odourless, and has no chemical action on metals.

Trade Notes.

ANTIPYRIN.—Dr. Knorr, the discoverer and patentee of antipyrin, is said to have cleared more than £200,000. during the late epidemic of influenza.

SULPHUR COMPANY, LIMITED.—Mr. Samuel Harrison, for many years formerly connected with Kurtz's, has been appointed, we understand, manager to this company.—*Liverpool Journal of Commerce.*

THE LEYTON SEWAGE DISPOSAL WORKS.—At the meeting of the Junior Engineering Society on the 11th inst., Mr. J. G. Browning read a paper on the "Leyton Sewage Disposal Works," describing very fully the methods there adopted for treating the sewage. Up till 1883 the sewage of the town was dealt with by simple filtration through straw and charcoal, at which date treatment by sulphate of alumina was introduced, but abandoned twelve months later on account of its expense. Mr. Hanson's chemical process was then substituted, and has since been worked with satisfactory results down to the present time. The chemicals used in this process are lime and a powerfully-oxidising powder prepared from alkali waste containing both hyposulphites and sulphate of lime. About 16 cwt. of lime and 3 cwt. of the powder are used per million gallons of sewage; and the resulting effluent is free of offensive odour, and is discharged into the River Lea. The quantity treated per 24 hours averages about 1½ million gallons, the main part of which flows into the mixing and settling tanks without requiring to be pumped. The sludge obtained, amounting to 110 tons per week, is pressed into cakes in the usual way, and is used as manure, though farmers do not consider it sufficiently valuable to cart away to any considerable distance.

THE FIXATION OF ATMOSPHERIC NITROGEN IN GAS PURIFIERS.—The subject of the fixation of atmospheric nitrogen in the forms of cyanogen and ammonia compounds is likely to attract an increasing amount of attention in connection with the employment of air to assist in the purification of coal gas. Many attempts have been made to produce cyanides directly from atmospheric nitrogen, as well as to obtain ammonia from the same source; but all manufacturing processes especially designed for this purpose have failed commercially, although some have attained experimental success. Yet cyanides are constantly being formed incidentally to furnace operations, and where alkaliized carbon at a high heat is exposed to air and steam. Under such conditions, at a low heat, the nitrogen may be fixed as ammonia, and at a high heat as a cyanide. It is a question how far the reactions that go on inside an oxide of iron gas purifier include the fixation of atmospheric nitrogen; but cyanides and ferro-cyanides are being manufactured in Germany from the spent oxide of gas-works with which probably air has not been used. There are gas works in the United Kingdom where 3 per cent. of air and upwards is admitted into oxide purifiers for the sake of revivifying the purifying material *in situ*. It would be interesting to know whether, and if so under what conditions, any of the nitrogen of this air is fixed in the material as cyanides or as ammonia.—*Journal of Gas Lighting.*

Market Reports.

METAL MARKET REPORT.

	Last week.		This week
Iron	44/11	....	44/8½
Tin	£90 5 0	....	£92 0 0
Copper	48 7 6	....	49 0 0
Spelter	20 15 0	....	21 7 6
Lead	12 17 6	....	12 7 6
Silver	46d.	....	47d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	16¼	16¼	17
Mason & Barry	6¼	6¼	6½
Tharsis	4½	5½	4½
Cape Copper Co. ..	3½	3½	4
Namaqua	2	2½	2½
Copiapu	2½	2½	2½
Panulcillo	1½	1½	1½
Libiola	2½	2½	2½
New Quebrada	½	½	½
Tocopilla	1/-	1/6	1/-
Argentella	3d.	9d.	3d.

TAR AND AMMONIA PRODUCTS.

The Tar products market remains in about the same condition reported last week; 90's Benzol is selling for 3s. 6d., and 2s. 7d. 2s. 7½d. for 50/90's. Solvent naphtha and creosote still in go demand. The future of crude carbolic acid is still uncertain. There are indications that so soon as the demand reaches the supply we shall have better prices again, as all that is at present being produced finding a sale without any further reduction in price. Anthracene remains at old rates, the markets are lifeless and buyers are not anxious to operate. Pitch remains at about 28s., West Coast ports.

The sulphate of ammonia market is without any new feature, and little disposition is shown to purchase for near delivery, buyers do not order only when they have immediate wants. Makers, however, are not now quite so pressing, and if they continue in this course and only offer to meet the demand, the position will right itself in time. Values are: Beckton, £11. 5s., London outside makers £11. 6s. 3d., Hull, £11. 2s. 6d. to £11. 3s. 9d., according to quality. The price at Leith varies from £11. 1s. 3d. to £11. 2s. 6d.

MISCELLANEOUS CHEMICAL MARKET.

There has been more firmness in bleaching powder during the past week, and prices remain at £5. per ton on rails and £5. 5s. £5. 7s. 6d. f.o.b. The caustic soda reaction has not yet ceased, and values on the spot are 7s. 6d. to 10s. below the quotations of a week ago. 70's are offering at £8. 17s. 6d. to £9., and 74 % at £10. 1 f.o.b. Liverpool. White and cream, 60 % less abundant in supply stand at £8. 7s. 6d. and £8. 5s. per ton respectively at makers' works. Soda ash still very firm for ordinary carb, 48 % to 58 %, at 1½d. per deg. f.o.b.; caustic ash at 1½d. per deg. f.o.b. Soda crystals £2. 17s. 6d. in casks on rails. Salt cake in bulk, 25s. per ton on rail. Chlorate of potash has given way, and can be bought from makers' re-sellers at 4½d. to 4¾d. per lb. Vitriol and muriatic acids continue in good demand, and prices are unaltered. Sulphur quiet, and price without change. Sulphate of copper somewhat irregular, and realises from £24. 10s. to £25. 10s. for prompt delivery. The position of the market is unchanged, acetates of lime moving slowly at £7. 17s. 6d. £8. for brown and £13. 15s. for grey. Acetate of soda rather firm. Acetic acids quiet. Acetates of lead dull, but makers are firm, and good white realises £23. 5s. to £23. 10s. per ton c.i.f. at usual ports. Brown, £18. 5s. to £18. 10s. Nitrate of lead also firm at £22. £22. 10s. Nitrate of soda still offering at 8s. per cwt. Potash caustic and carbonate scarce, and firm for early deliveries. Arsenic in good demand, and makers fully booked with orders. Carbolic acids dull and prices continue to droop. Tartaric acid, 1s. 3d. per lb. There are yet no signs of improvement in demand from the general shipping or home trade.

REPORT ON MANURE MATERIAL.

The business during the past week has been very much of the same character as that throughout April—mainly for prompt or ex-store delivery, and with falling prices, except in the case of nitrate of soda which closes firm at a shade above values a month ago. Mine phosphates continue without much alteration in the situation, attitude of manure manufacturers being that of waiting for easier prices for material while still busy getting out their manures. The minor cargo of River Plate bones and bone ash, December sailing, named a week ago as having arrived at port of call, has been sold on private terms, but understood to be a shade under £5. 7s. 6d. for bones, and £4. 17s. 6d. or 70% for the bone ash.

East India Bone Meal is somewhat easier, £5. 7s. 6d. having been accepted ex-store, Liverpool, and a shipment arrived subsequently hanging fire at the price. To arrive near at hand less would probably do, and for shipment ahead £5. would be cabled out for chance business. Some further sales of crushed Kurrachee bones have been made at £5. 2s. 6d. per ton, ex-quay Liverpool, and that price would be accepted for 200 tons now in dock—perhaps £5. 1s. 3d. Several parcels of common grinding bones have been sold during the week at £4. 5s. for a dirty parcel of Turkish, up to £4. 16s. 3d. for a lot of clean dry hard Brazils, there being still a demand for really good cl bones, both for charring and grinding. Nitrate of soda is decidedly firmer on the week, and large sales have been made both on spot, at call, and for shipment, at advanced prices. Spot is firm at 8s. 1½d. good ordinary quality, and at 8s. 3d. for refined. 8s. 1½d. has been paid for a refined cargo at port of call for the Mersey, and 8s. 0¾d. an ordinary cargo for U.K. Business has been done at from 8s. 4½d. for June sailing up to 8s. 9d. for September-October. Home produced dried blood continues to offer at 10s. 6d. per unit of ammonia free rails at works, and this price asked for River Plate in section.

round hoof is still to be had at 9s. per unit, f.o.r. at works, could probably do for quantity. getting scarcer, and 40s. now generally required. phosphates are somewhat firmer, stocks having been much the continued drain upon them. Manufacturers seem to demand higher prices for any orders outside their regular con-

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

is not much of a front of improvement to show, we are at least off than we were a week ago. Caustic soda has continued the and is now down to about the figures of the beginning of March buyers are once more showing some life and a very fair bulk passing. Orders for bichromate of potash and bichromate of have been coming in more freely during the week, and the of the previous ten days has been partly made up for. In turning oil is, if anything, lower of vitality still, with Scotch ically upheld, and values to English consumers a halfpenny wer; but scale and wax are both very strong, and there is prospect of prices being further advanced by the combined of Scotland and America. This, if realised, will be followed candles, on the part of the associated English and Scotch In addition to caustic, soda ash also is the turning of the scale bleach with us is pretty firm as things go, and quotations are maintained. Sulphate of ammonia has again weakened ptibly, and buyers may to-day supply themselves freely at spot Leith; while now also for forward, contracts are being w down as £11. 7s. 6d. Chief prices current are:—Soda os. 6d. net Tyne; alum in lump £5. less 2½% Glasgow; lish refined £29., and boracic acid, £37. 10s. net Glasgow; 1¼d. less 2½% Tyne; caustic soda, white, 76°, 70/72°, £9., 60/62° £8. 5s., and cream, 60/62° £8., 2% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., casks, £6. 10s. net Tyne; refined alkali 48/52°, t Tyne; saltcake, 25s. 6d., to 27s.; bleaching powder, o £5. 15s. less 5% f.o.r. Glasgow; bichromate of potash, of soda 3d., less 5 and 6% to Scotch and English buyers y; chlorate of potash, 4¾d., less 5% any port; nitrate of to 8s. 3d.; sulphate of ammonia, spot, £11. 5s. f.o.b. lammoniac, 1st and 2nd white, £37. and £35., less port; sulphate of copper, £25., less 5% Liverpool; cale, hard and soft, 2½d. per lb.; paraffin wax, 120°, d, 3½d.; paraffin spirit (naphtha), 8d. a gallon; paraffin g), 6¾d. to 7d. on rails, Glasgow for Scotch consumption lish orders done at about 1¼d. a gallon lower); ditto g), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 7. 15s. to £8. Week's imports of sugar at Greenock to bags.

THE LIVERPOOL MINERAL MARKET.

little change to report in our market this week. Manganese ave rather fallen off, and prices continue firm. Magnesite: a to the previous stocks large arrivals have taken place and quite in hands of buyers. Rav ground, £6. 10s.; and round, £10. to £11. Bauxite (Irish Hill brand) in excep- roneg demand at full prices—Lun p, 20s.; seconds, 16s.; ; ground, 35s. Dolomite, 7s. 5d. per ton at the mine. alk: Arrivals this week are very small, and prices un- specially for G.G.B. "Angel-White" brand—90s. to 95s. oos. to 105s. superfine. Barytes (carbonate) easy; selected ip scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and 70s.; smalls, 50s.; best ground, £6.; and selected crystal l. Sulphate has somewhat improved, best lump, 35s. 6d.; good os.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; st white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. umicestone quiet; ground at £10., and specially selected st quality, £13. Iron ore unchanged. Bilbao and Santan- 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in and at 18s. to 24s. Purple ore as last quoted. Spanish ous ore selling freely at good prices. Emery-stone: s still asked for, and business is being done at full prices, for prompt. No 1 lump is quoted at £5. 10s. to £6., and to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue ; fine impalpable ground, £7. Scheelite, wolfram, tungstate d tungsten metal inquired for. Chrome metal, 5s. 6d. per lb. lloys 2s. per lb. Chrome ore: Still further arrivals, prices ntimony ore and metal have further advanced. Uranium s. to 26s. Asbestos scarce, bringing increased prices. ad ore firm; smalls, £14. to £15.; selected lump, £16. to

£17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in demand, firm at 22s. to 25s. Plumbago: steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel in good demand at stronger figures. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS.—Unaltered. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23.; Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE TYNE CHEMICAL REPORT.

TUESDAY.

The Chemical Market has been decidedly dull during the past week, and prices generally have been gradually dropping every day. The chief feature has been the heavy fall in the price of caustic soda, brought about, principally by the collapse of the Liverpool market for this article. To-day's price is 20s. a ton under that of a week ago. Bleaching powder has dropped half-a-crown a ton, and continues quiet with little business doing. Soda ash is slightly easier in price by about 10s. 6d. per ton. Sulphate of soda is little enquired after, and prices are merely nominal. Soda crystals are the only exception to the general state of dullness. There is an excellent demand for them, and last week's quotations are fully maintained. The following are to-day's market prices:—Bleaching powder, in softwood casks, £5. 5s. per ton; caustic soda 77%, £10. per ton, ground in 3-4 cwt. barrels, £14. per ton; soda ash, 1¼d. per degree less 2½%; soda crystals, in 1cwt. bags, net weight, £2. 13s. 6d. per ton, in 2 cwt. bags, net weight, £2. 11s. per ton; in casks, gross weight, £2. 11s. per ton; sulphate of soda, in bulk, £1. 15s. per ton; ground, in casks, £2. 5s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4¾d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, 1 cwt. kegs, £5. 15s. per ton, in 5-7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

Manufacturing coals continue in strong demand, and prices remain very firm. Northumberland steam small has been advanced sixpence per ton during the past week, and are now quoted from 8s. 6d. to 8s. 9d. per ton. Durham small is quoted 10s. per ton.

Mr. James M'Culloch, manager of the Sulphuric Acid and Decomposing Departments of Messrs. Charles Tennant and Partners, Limited, Hebburn, has been appointed resident manager of the chemical works of Messrs. C. Tennant and Co., Limited, of St. Rollox, Glasgow.

New Companies.

KELSEY'S PATENT ADJUSTABLE HAT SYNDICATE, LIMITED.—This syndicate was registered on the 18th inst., with a capital of £6,000, in £1. shares, to acquire and work the letters patent granted to John Robinson Kelsey for the manufacture of soft fitting hats, and for the preparation and employment of ingredients for the purpose of such manufacture. The subscribers are:—

L. F. Marsh, Bristol, manufacturer	1
W. S. Halbert, 16, Ashburn-place, S.W.	1
J. H. Wallery, Bristol, chartered accountant	1
A. S. Trotman, Bristol, solicitor	1
W. H. Wall, Bristol, traveller	1
R. H. N. G. F. Lambert, Bristol, merchant	1
C. C. Hinshelwood, 5, Portland-mansions, Oxford-street	1
VENEZUELA TELEPHONE AND ELECTRICAL APPLIANCES COMPANY, LIMITED.—	
This company was registered on the 22nd inst., with a capital of £70,000, in £1.	

shares, to carry on in Venezuela the business of a telephone, telegraph, and electric company. The subscribers are:—
 Sir Douglas Fox, Kingston-on-Thames..... 250 Shares.
 J. W. Phillips, M.P., 24, Queen Anne's-gate..... 250
 L. Franke, Winchester-house..... 2,000
 W. P. Van Laar, 47, Rue de Petites Ecuries, Paris, merchant..... 250
 D. Antaiminson, Amsterdam, banker..... 500
 J. Simpson, Bushey-view, Hampton Wick, merchant..... 100
 H. P. Gilbert, 7, Poplar-grove, Shepherd's Bush-road..... 250

JACOBS PETROLEUM SYNDICATE, LIMITED.—This company has been registered on the 18th inst., with a capital of £30,000, in £5. shares, to acquire and work petroleum properties in any part of Russia or elsewhere, and for such purposes to adopt an unregistered agreement of 27th ult., made with Sir Peter Tait. The subscribers are:—
 Wm. Ellison Macartney, M.P., Palace-chambers, Westminster..... 1
 F. Falden, M.P., Carlton Club..... 1
 E. Hugovin, 12, Queen-street, E.C..... 1
 A. J. Miell, Claremont-road, Highgate..... 1
 W. Whiten, 56, Plimsoll-road, Finsbury-park..... 1
 G. S. Williams, 46, Huxley-road, Queen's-park..... 1
 W. S. Newland, 32, Medora-road, Forest-hill..... 1

THE CHEMICAL SALT CO., LIMITED.—This company has been registered at Edinburgh, with a capital of £40,000, divided into 4,000 £10. shares, to take over and purchase from the firm of Charles Tennant and Co., St. Rollox, Limited, the lease of certain mines, pits, veins, and seams of salt and salt rock, and to carry on in the United Kingdom or elsewhere the trade or business of salt miners and masters, salt and chemical manufacturers and merchants. The first subscribers are:—

Charles Tennant, Bart.....
 Hugh Brown.....
 William McLure.....
 James King, Bart.....
 Jonathan Thompson.....
 Francis John Tennant.....
 Thomas Alexander.....

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Mechanical Stokers. J. Proctor. 5,603. April 14.
 Tin-Smelting Furnaces.—(Complete Specification). J. Letcher. 5,608. April 14.
 Furnace Bars and Grates. W. Fraser. 5,616. April 14.
 Manufacture of Washing Soap. J. Bowden and S. Hern. 5,620. April 14.
 Brewing. R. Haddan. 5,629. April 14.
 Steam Generators. J. M. Stratton. 5,633. April 14.
 Tin Smelting. T. Teague. 5,638. April 14.
 Revolving Boilers used in Paper Making. H. J. Rogers and J. Paramore. 5,661. April 15.
 Fermentation. J. Salomon. 5,673. April 15.
 Automatic Regulation of Electric Currents. J. Kalb. 5,678. April 15.
 Producing Low Tension Alternating Electric Currents. E. Manville and W. L. Madgen. 5,716. April 15.
 Manufacture of Cement. W. R. Taylor. 5,719. April 15.

Colouring Matters. J. Hall. 5,721. April 15.
 Diquinolyline Derivatives. B. Willcox. 5,722. April 15.
 Phenacetine Derivatives. B. Willcox. 5,723. April 15.
 Promoting Circulation in Water and Steam Boilers. O. Imray. 5,724. April 15.
 Removable Fire-Bricks for Boiler Furnaces. O. Imray. 5,734. April 15.
 Azo Colouring Matters Derived from Azoxyamines. J. Imray. 5,737. April 15.
 Colouring Matters Derived from Fluoresceine. J. Imray. 5,737. April 15.
 Testing Galvanometers. A. Jamieson. 5,748. April 16.
 Armatures for Dynamos. R. E. B. Crompton. 5,750. April 16.
 Linseed Presses. H. King and W. Marshall. 5,765. April 16.
 Steam Boilers. G. Ellams. 5,766. April 16.
 Grey Basic Colouring Matters. O. Imray. 5,777. April 16.
 Black Colouring Matters. O. Imray. 5,780. April 16.
 Heating and Cooling Liquids. H. H. Lake. 5,785. April 16.
 Galvanic Batteries. F. L. Rawson. 5,810. April 17.
 Substitute for Glass. S. Raudnitz. 5,815. April 17.
 Wool Extracting. C. Womach. 5,828. April 17.
 Refining Cotton and other Oils. G. Tall. 5,833. April 17.
 Automatic Electric Controlling Apparatus. J. Radcliffe. 5,836. April 17.
 Distillation of Mineral Oils. C. M. Pielsticker. 5,838. April 17.
 Rods of Parchmentized Fibre.—(Complete Specification). R. P. Frist. 5,841. April 17.
 Generating Steam and Economising Fuel. W. B. Leachman. 5,847. April 17.
 Manufacture of Slag Fibre. C. Wood. 5,847. April 17.
 Utilizing Exhaust Steam in Ammonia Refrigerators. J. A. Osenbri. 5,855. April 17.
 Regulating Supply of Oxygen and Hydrogen Gases to Burners. E. Presbrey. 5,861. April 17.
 Evaporating Salt Water for Marine Boilers. J. Kerr. 5,891. April 19.
 Steam Generators. A. G. Brown. 5,897. April 19.
 Insulating Electrical Conductors. A. J. Jarman. 5,910. April 19.
 Polishing Compounds. J. Hill, senior, J. Hill, junior, and A. R. Hill. 5,919. April 19.
 Secondary Batteries. P. Schoop. 5,920. April 19.
 Steam Boilers. P. Oriolle. 5,922. April 19.
 Smelting of Metals. W. C. Loe. 5,937. April 19.
 Secondary Batteries. K. E. Boettcher. 5,938. April 19.
 Extracting and Purifying Oils and Perfumes.—(Complete Specification). H. H. Lake. 5,940. April 19.
 Manufacture of Ceramic Ware. H. M. Ashley. 5,970. April 19.
 Distillation of Oils. J. Dewar and B. Redwood. 5,971. April 19.

Gazette Notices.

PARTNERSHIPS DISSOLVED.

ADELAIDE HART and B. HART, under the style of Albert Hart, Houndsditch, London, felt hat and cap manufacturers.
 EDWARDS and GEORGE, Newport, Mon., brewers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

PERCY JOHN OTTEY, Burton-on-Trent, Chemist and Druggist.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.			
Week ending April 22nd.			
Acetone—		Morocco, 12	T. Clark
Holland, £50.	Beresford & Co.	Trebizonde, 19	Culverwell, Brooks & Co.
Acetic Acid—		E. Indies, 250 t.	Gonne, Croft & Co.
Holland, 95 pks.	A. & M. Zimmermann	Barytes—	
Arsenic—		Belgium, 117 cks.	A. Zumbeck & Co.
Germany, £60	L. & I. D. Jt. Co.	" 11	J. L. Lyon & Co.
Acetate of Lime—		Germany, 23	O'Hara & Hoar
U.S., £205	W. Thatcher	Holland, 66	D. Storer & Sons, Ltd.
Antimony—		" 28	H. Harrison & Co.
Japan, 35 t.	H. Rogers, Sons & Co.	" 3	O'Hara & Hoar
Antimony Ore—		Carbonic Acid—	
A. Turkey, 5 t.	J. Ford & Co.	Holland, 12 pks.	J. G. Fischer
Spain, 10	H. Bath & Son	Caoutchouc—	
" 9	J. W. Cater, Sons & Co.	France, 34 c.	L. & I. D. Jt. Co.
Austria, 61	H. R. Merton & Co.	E. Indies, 111	Ross & Deering
A. Turkey, 5	French & Smith	Colon, 74	Henderson Bros.
Portugal, 50	H. Emanuel	" 4	Lewis & Peat
Sydney, 9	H. Bath & Sons	" 2	L. & I. D. Jt. Co.
A. Turkey, 38	H. Emanuel	Cape, 7	W. M. Smith & Sons
Bones—		S. Africa, 6	J. Owen
Holland, 58 t.	E. Willson	Mauritius, 107	Hammond & Co.
Sydney, 10	Coml. Bkg. Co., of Sydney	France, 4	L. & I. D. Jt. Co.
U. S., 15	Hicks, Nash & Co.	Inhabane, 16	"
		Tamatane, 159	"
		" 118	Union Lighterage Co.
		Germany, 2	L. & I. D. Jt. Co.
		Cream of Tartar—	
		Italy, 10 pks.	B. & F. Wf. Co.
		" 5	F. Smith
		Spain, 2	B. & F. Wf. Co.
		" 20	W. C. Bacon & Co.
		Copper Ore—	
		Natal, 9 t.	H. Bath & Son
		Chemicals (otherwise undescribed)	
		Germany, £135	A. & M. Zimmermann
		U.S., 296	Lister & Biggs
		Germany, 15	F. Stahlschmidt & Co.
		" 178	W. Balchin
		" 5	H. J. Perlbach & Co.
		" 70	T. H. Lee
		" 382	A. & M. Zimmermann
		France, 15	Cartnutt & Co.
		Germany, 43	W. Burton & Sons
		Holland, 30	G. Steinhoff
		" 5	Phillipps & Graves
		Dyestuffs—	
		Oreochalla	
		France, 27 bls.	Kebbel, Son & Co.
		Valonia	
		A. Turkey, 158 t.	A. & W. Nesbitt
		" 167	Hicks, Nash & Co.
		" 220	J. Graves
		" 42	Anning & Cobb
		" 100	Boucher, Mortimore & Co.
		" 50	Adam I
		" 75	Hicks, Nash & Co.
		Justic	
		Belize, 5 t.	A. Haq
		Logwood	
		Mexico, 25 t.	C. Leary & Co.
		Cochineal	
		Canaries, 49 pks.	Zinton & S
		" 28	W. M. Smith & S
		Myrabolams	
		E. Indies, 317 pks.	Marshall
		" 300	Arbuthnot, Ewar
		" 700	Ide & Chri
		Dyestuffs (otherwise undescribed)	
		Germany, 19 pks.	Fleming's O
		" 19	Chemical Co., Limi
		France, 5	C. Atkins & Nis
		" 150	Hemingway & Co.
		Denmark, 1	R. J. Fullwood
		" 1	Bl
		Bahia, 40 t.	L. & I. D. Jt.
		E. Indies, 120	Benekendorff & Co.
		" 210	W. A. Bowdi
		" 80	Falkenberg & He
		Indigo	
		E. Indies, 64 chts.	L. & I. D. Jt.
		" 4	F. Huth & Co.
		" 3	Patry & Past
		" 122	L. & I. D. Jt.
		" 45	W. Brandt, Sons & Co.

9 snrs. L. & I. D. Jt. Co.	Plumbago —	5 T. Millington	Old Calabar, 26 African Association
18 Patry & Pasteur	E. Indies, 37 cks. H. Lambert	3 Samson & de Liagre	5 brls. E. Grund
18 A. Juninez & Sons	" 80 brls. Doulton & Co.	" 4 "	Accra, " 1 cs. A. Reis
11 chts. L. & I. D. Jt. Co.	" 160 Sawyer Mead, & Co.	" 77 "	" 13 cks. 2 brls. D. P. Pearce
23 " 139 T. Jordan & Co.	" 193 J. Thredder, Son, & Co.	" 99 Edward Bros.	" 8 J. F. Morton
20 E. H. Gauntlett	" 348 cks. L. & I. D. Jt. Co.	10 Lintott, Bros. & Co.	" 2 Davies, Robbins, & Co.
10 L. & I. D. Jt. Co.	" 384 brls. J. Forsey	3 brls. Co.	Salt Pond, 2 1 cks. Pickering & Berthoud
1 snr. "	Germany, 37 cks. B. Gallaway	" 1 N. P. Nathan & Son	" 3 1 W. B. M'Iver & Co.
96 chts. "	Paraffin Wax —	" 1 W. Griffiths & Co.	Cape Coast, 2 brls. 1 cs. W. D. Woodia
11 Patry & Pasteur	U. S., 565 brls. H. Hill & Sons	" 1 cs. F. & A. Swanzy	" 1 Kronig & Liegler
5 G. N. Ry. Co.	" 165 G. H. Frank	" 1 F. Schaeffer & Co.	" 8 Iblers & Bell
10 Philipps & Graves	Germany, 44 cs. Grossmith & Luboldt	" 4 W. B. M'Iver & Co.	" 2 A. Millerson & Co.
162 pks. J. H. & G. Scovell	U. S., 1,350 brls. J. H. Usmar & Co.	" 3 Edwards Bros.	" 1 Davies, Robbins, & Co.
257 S. Barrow & Bros.	Potassium Bromide —	" 2 cks. Pitt, Bros. & Co.	Secondee, 3 pns. Paterson, Zachonis, & Co.
Bark	Germany, £95 L. & I. D. Jt. Co.	" 1 Radcliffe & Durant	" 27 Broklehurst, Son, & Co.
293 t. Leach & Co.	Pearl Ash —	22 pns. J. P. Werner	" 26 Pickering & Berthoud
50 H. Henle's Sucrs.	France, 200 c. F. W. Berk & Co.	" 4 Davies, Robbins, & Co.	" 13 2 pks. 7 pns.
10 J. Vicary & Sons	" 140 Petri Bros.	" 1 A. Breslaur & Co.	Dixcove, 1 1 cs.
17,227 Baxter & Hoare	Potassium Permanganate —	" 1 T. E. Tomlinson	" 1 bg 1 Radcliffe & Durant
40 A. & W. Nesbitt	Holland, £56 Spies, Bros., & Co.	" 2 F. J. Eaton & Sons	" 1 brl. 2 F. & A. Swanzy
28 Devitt & Helt	Pyrites —	" 8 A. Miller, Son, & Co.	Barcelona, 6 bls. Arkle & Mounsden
30 pks. T. Ronaldson & Co.	Spain, 2,041 t. C. Tennant, Sons, & Co.	" 2 J. H. Rayner & Co.	Charcoal —
360 Best, Ryley, & Co.	Portugal, 1,150 Mason & Barry, Lmtl.	" 14 J. Swift	Rouen, 40 bgs. Co-op. W'sale Socy, Lmtl.
103 A. J. Humphrey	Saltpetre —	" 1 Edwards Bros.	Cream Tartar —
200 Elkan & Co.	Germany, 915 cks. P. Hecker & Co.	" 2 3 cks 2 cts. W. B. M'Iver & Co.	Barcelona, 5 bds. F. Reid & Co.
10 L. J. Levinstein & Sons	T. Merry & Son	" 2 Radcliffe & Durant	Chemicals (otherwise undescribed)
365 Swanston & Co.	E. Indies, 796 bgs. Buissan & Co.	" 1 pn. 14 3 cts. Fletcher & Fraser	Rouen, 9 cks. Co-op. W'sale Socy, Lmtl.
1 pks. Thames S. Tug Co.	Stearine —	" 6 1 A. Miller, Bros., & Co.	Rotterdam, 12 cks.
10 B. Jacob & Sons	Germany, 145 cks. W. Balchin	Assinee, 13 bgs. 1 brl. Millward, Bradbury, & Co.	Dyestuffs —
37 pks. Brown & Elmslie	France, 55 Beriesford & Co.	Sierra Leone, 24 cks. Paterson, Zachonis, & Co.	Argols
400 pks. 400 c. J. Barber & Co.	" 55 sks. J. Goddard & Co.	" 48 Pickering & Berthoud	Bordeaux, 24 sks.
15 90 M. D. Co.	Tartaric Acid —	" 1 bg. W. C. Taylor	Sumac
100 800 T. M. Duché & Son	Italy, 57 pks. B. Jacob & Sons	Cie Francaise	Barcelona, 100 bgs. A. Ruffer & Son
25 200 L. Suto & Co.	Holland, 20 B. & F. Wf. Co.	Pernambuco, 2 bls. 14 brls.	Palermo, 50 bgs.
00 600 " "	France, 11 " "	C. C. Castle, 5 pks. W. B. M'Iver & Co.	Logwood
50 300 Prop. Scott's Whf	Holland, 18 " "	" 2 brls. A. Millerson & Co.	Boston, 250 bxs.
00 840 J. H. Epstein	Tartars —	" 2 Fletcher & Fraser	Belize, 340 Brownbill & Co.
25 200 L. Suto & Co.	Italy, £2,380 Thames S. Tug Co.	" 4 pks. A. Miller, Bros., & Co.	Jamaica, 40 t.
45 354 " "	Germany, 2 cs. H. Brooks & Co.	" 2 cks. 1 cs. C. L. Clare & Co.	Valonia
12 110 L. & I. D. Jt. Co.	Holland, 8 Becker & Ulrich	" 2 2 A. Reis	Syria, 35 bgs. Bucura & Economi
25 301 Props. Chambs. Whf	Belgium, 6 Leach & Co.	Grand Bassam, 1 Grimwade, Ridley, & Co.	Smyrna, 30 bgs. 100 t. Barry Bros.
20 160 T. M. Duché & Co.	Verdigris —	" 1 Schaeffer & Co.	Nantes, 30 cks. R. J. Francis & Co.
30 200 J. Barber & Co.	France, £78 Skilbeck Bros.	" 3 A. Reis	Havre, 100 20 cs.
33 1,333 W. R. Spence	Zinc Oxide —	Sierra Leone, 12 Cie Francaise	New York, 10 bxs. 11 brls.
00 500 Barrett, Tagant, & Co.	Germany, 50 cks. W. A. Rose & Co.	" 4 Paterson, Zachonis, & Co.	Rouen, 540 cks. Co-op. W'sale Soc., Ltd.
48 380 J. Knill & Co.	LIVERPOOL	" 15 Pickering & Berthoud	Marseilles, 65 brls.
95 2,650 Anderson, Weber, & Smith	Albumen —	Bathurst, 11 Cie Francaise	Philadelphia, 75 175 bxs.
25 220 J. H. Epstein	Genoa, 10 cs. H. Fehr & Co.	" 5 A. Cros & Co.	Myrabolams
88 846 Seaward Bros.	Acetic Acid —	Cameroons, 12 R. & W. King	Bombay, 667 bgs.
25 204 Pillow, Jones, & Co.	Rouen, 2 cks. R. J. Francis & Co.	" 3 Rider, Son, & Co.	" 340 W. & R. Graham & Co.
— Beresford & Co.	Rotterdam, 6 bskts. "	" 4 A. Herschell	Fustic
520 Spies, Bros., & Co.	Alum —	2 pns. Lucas, Bros., & Co.	Carthage, 1,553 ps. Mildred, Goyeneche & Co.
Alum —	Rotterdam, 40 cks. 6 "	Addah, 1 cs. 2 cks. 3 pns. W. J. Rodatz	Colon, 1,337 A. Dobell & Co.
315 c. Kaltenbach & Schmitz	Antimony Ore —	" 1 bg. 23 Radcliffe & Durant	Logwood
158 Kleinwort, Sons, & Co.	Marseilles, 668 bgs.	Accra, 1 brl. 3 pns. F. & A. Swanzy	New York, 10 brls.
380 J. H. & G. Scovell	Borate of Lime —	Salt Pond, 2 brls. 1 cks. W. B. M'Iver & Co.	" 42
1 Lavington Bros.	Antofagasta, 1,530 bgs. Cockbain, Allardice, & Co.	" 20 Miller, Bros., & Co.	Glucose —
2 t. Anglo Contl. Guano Wks.	Bleaching Powder —	" 3 Radcliffe & Durant	Hamburg, 200 bgs. 25 cks.
— Leghorn, 127 cks.	Ancona, 1 brl.	" 2 cs. W. Griffiths & Co.	Horn Piths —
1 pks. L. & I. D. Jt. Co.	Borax —	" 1 ck. F. & A. Swanzy	Hamburg, 25 t.
— Lewis & Peat	Leghorn, 127 cks.	Colon, 3 brls. A. Dobell & Co.	Manganese —
— L. & I. D. Jt. Co.	Bones —	Mussera, 4 bgs. J. M. Williams	Carthage, 1,950 t. Wigan Coal & Iron Co.
— Props. Hay's Whf.	Syria, 1,096 bgs. C. Nicolaidis	Ambrizette, 4 cks. Taylor, Laughland, & Co.	Manure —
osphate	Constantinople, 110 bgs.	" 3 J. Holt & Co.	Bruges, 30 bgs.
02 t. Lawes Manure Co., Lmtl.	Smyrna, 35 t.	" 29 bgs.	Manganese Ore —
530 t. J. Burnett & Sons	Colon, 418 bgs. A. Dobell & Co.	Muculla, 14 cks. Taylor, Laughland, & Co.	Coquimbo, 40 t.
50 A. Hunter & Co.	Sidon, 180	" 44 bgs. Sampson & de Liagre	Carrizal, 940
199 Ang. Cont. Guano Wks.	Tripoli, 85 t.	Quinzao 152	Nitrate —
281 cu. bgs. A. Ford & Co.	Valparaiso, 673 sks. Jones & Roberts	Banana, 4 brls. Daumas & Co.	Calais, 566 t.
Bicarbonate —	Constantinople, 12 bgs. Jivan, Tekian, & Co.	Black Point, 2 cks. 1 cs. Pinto Leite, & Nephew	Phosphoric Acid —
pks. A. & M. Zimmermann	" 249 Jivan Tekian	Loango, 4 Edwards Bros.	Bremerhaven, 16 cs.
Sulphate —	Barytes —	Sette Cama, 23 J. Holt & Co.	Potash —
cks. Weatherley, Mead, & Co.	Antwerp, 41 bgs.	Cape Lopez, 38 cks. J. Holt & Co.	Rouen, 16 cks. Co-op. W'sale Society, Limited
102 t. Anglo Contl. Guano Wks.	Caoutchouc —	Gaboon, 6 " "	Dunkirk, 9
	Ambriz, 13 cks. Taylor, Laughland, & Co.	Elobey, 16 " "	Phosphates —
	Ambrizette, 9 " "	Gaboon, 7 Daumas & Co.	Bruges, 510 bgs. J. T. Fletcher & Co.
	Muculla, 47 37 bgs. " "	" 21 A. V. Heyder	Pitch —
	Kinembo, 5 " "		Rotterdam, 28 cks.
			" 10

Paraffin Wax—
Baltimore, 100 brls.
Sugar of Lead—
Rouen, 34 cks. R. J. Francis & Co.
Sodium Nitrate—
Iquique, 8,220 bgs.
Pisagua, 11,580 F. Lacioz
Stearine—
Antwerp, 38 bgs.
New York, 50 hds.
Tartar—
Bordeaux, 2 cks.
" 3
Tartaric Acid—
Rotterdam, 12 cks.
" 11
Marseilles, 1 brl.
Ultramarine—
Rotterdam, 6 cs.
Waste Salt—
Hamburg, 350 t.
Zinc Ashes—
Boston, 19 brls.
Zinc Oxide—
Antwerp, 5 brls. J. T. Fletcher & Co.
" 85

HULL.

Week ending April 24th.

Aluminium Sulphate—
Rotterdam, 40 cks. W. & C. L. Ringrose
Acid (otherwise undescribed)
Rotterdam, 12 cks. W. & C. L. Ringrose
" 1 G. Lawson & Sons
Albumen—
Hamburg, 10 cks. Wilson, Sons, & Co.
Arsenic—
Hamburg, 100 kgs. "
Barytes—
Antwerp, 100 bgs. Wilson, Sons, & Co.
Rotterdam, 23 cks.
Ghent, 40 H. F. Pudsey
Bremen, 19 cks. Blundell, Spence, & Son
" 23 Tudor & Son
Bones—
Trieste, 3 pks. Wilson, Sons, & Co.
Chemicals (otherwise undescribed)
Genoa, 10 cks. Wilson, Sons, & Co.
Stettin, 42 "
Bremen, 3 2 cs. Veltmann & Co.
Dyestuffs—
Sumac
Palermo, 1,110 bgs. Wilson, Sons, & Co.
" 28
Extracts
Bordeaux, 50 cks. Rawson & Robinson
Hamburg, 80
Trieste, 40 brls. Wilson, Sons, & Co.
Fiume, 260 "

Bennet
Rotterdam, 8 cks. G. Lawsen & Sons
Orchella
Lisbon, 9 bgs. Bailey & Leatham
Alisarine
Rotterdam, 24 pks. W. & C. L. Ringrose
" 31 "
" 25 cks. Hutchinson & Son
" 6 W. & C. L. Ringrose
Glucose—
Dunkirk, 40 bgs. Wilson, Sons, & Co.
Hamburg, 21 cks. Woodhouse & Co.
" 21 "
" 100 bgs. G. Lawson & Sons
" 200 J. Cowburn
" 5 cks. Wilson, Sons, & Co.
Stettin, 5
Hamburg, 17
" 5
Stettin, 31
Hamburg, 100 cks. C. M. Lofthouse
" 15 Woodhouse & Co.
Horn Piths—
Stockholm, 1 bkt.
Manure—
Kainit
Hamburg, 508 bgs. J. Dalton, Holmes, & Co.
" 500 A. E. Peacock
Naphthol—
Rotterdam, 3 brls. Hutchinson & Son
" 1 bx. Wilson, Sons, & Co.
Naphtha—
Hamburg, 3 tns. 5 kgs. R. T. Bruce & Co.
Oxide—
Rotterdam, 5 cs. Hutchinson & Son
Hamburg, 8 G. Malcolm & Son
Pitch—
Rotterdam, 24 cks. Hutchinson & Son
Danzig, 46 Wilson, Sons, & Co.
Phosphate—
Dunkirk, 200 bgs. "
Ghent, 320 t. 204 bgs. "
Phosphorus—
Rotterdam, 8 drms. T. F. Bell & Co.
Rouen, 150 cs. Wilson, Sons, & Co.
Potash—
Rotterdam, 34 cks. W. & C. L. Ringrose
Dunkirk, 54 pks. 51 drms. Wilson, Sons, & Co.
Antwerp, 12 cks. "
Pyrites—
Huelva, 1,504 t. J. Dalton, Holmes, & Co.
Plumbago—
Genoa, 16 cks. Wilson, Sons, & Co.
Sulphate—
Antwerp, 25 cks. H. F. Pudsey
Silicate
Antwerp, 3 cks. Wilson, Sons, & Co.
Sulphur—
Marseilles, 20 bgs.
Catania, 207 brls. 400 bgs. 1,709 pks.

Saltpetre—
Rotterdam, 170 bgs. Wilson, Sons, & Co.
Sodium Nitrate—
Iquique, 6,034 bgs.
Tartar—
Bordeaux, 2 cks. Rawson & Robinson
Tar—
Dunkirk, 7 cs. Wilson, Sons, & Co.
Stockholm, 10 brls. "
Ultramarine—
Rotterdam, 3 cks.
Waste Salt—
Hamburg, 105 bgs. C. M. Lofthouse & Co.

GLASGOW.
Week ending April 24th.

Albumen—
Rotterdam, 7 cks. J. Rankine & Son
Barytes—
Rotterdam, 46 cks.
Barytes Sulphate—
Antwerp, 60 bgs. 6 cks.
Chloral Hydrate—
Rotterdam, 1 cs. J. Rankine & Son
Dyestuffs—
Logwood
Rotterdam, 1 ck. "
Alisarine
Rotterdam, 86 cks.
Extracts
Nantes, 90 cks.
Antwerp, 3
Madders
Bordeaux, 5 J. & P. Hutchinson
Glycerine—
Hamburg, 40 drums.
Glucose—
Hamburg, 100 cs.
Manure—
Phosphate Rock
Antwerp, 100 t.
Potash—
Rotterdam, 11 cks. J. Rankine & Son
" 20 "
" 5 "
Potassium Carbonate—
Hamburg, 45 cks.
Sodium Silicate—
Rotterdam, 1 cs. J. Rankine & Son
Sodium Sulphate—
Antwerp, 100 cks.
Tartar—
Bordeaux, 2 cks. J. & P. Hutchinson
" 2 "
" 10 "
" 5 "
Tartaric Acid—
Rotterdam, 3 cks. J. Rankine & Son
Ultramarine—
Rotterdam, 4 cks. 20 cs. J. Rankine & Son

Waste Salt—
Hamburg, 1,100 t. Lesler, Beck, & C
" 508 cks.
Zinc Oxide—
Antwerp, 50 cks.

TYNE.

Week ending April 24th.

Chemicals (otherwise undescribed)
Rotterdam, 1 ck. Tyne S. S. C
Glycerine—
Hamburg, 5 cs. Tyne S. S. C
Glucose—
Rotterdam, 1 ck. Tyne S. S. C
Saltpetre—
Hamburg, 7 cks. Tyne S. S. C
Salt—
Hamburg, 132 t. 6 bgs. "
Sulphur Ore—
Pomaron, 1,500 t. Mason & Ba
Drontheim, 670 R. S. Story & C

GOOLE.

Week ending April 16th.

Alum—
Rotterdam, 16 cks.
Caoutchouc—
Boulogne, 2 cks.
Dyestuffs—
Alisarine
Rotterdam, 1 ck.
Logwood
Hayti, 320 t.
Dyestuffs (otherwise undescribed)
Boulogne, 96 cs. 47 cks. 3 pks.
Glycerine—
Rotterdam, 3 pks.
Potash—
Calais, 20 cks.
Dunkirk, 2
Potassium Muriate—
Hamburg, 184 bgs.
Waste Salt—
Hamburg, 132 t. 508 bgs.

GRIMSBY.

Week ending April 19th.

Albumen—
Antwerp, 20 cs.
Chemicals (otherwise undescribed)
Dieppe, 10 cks.
Glucose—
Hamburg, 28 cks.
Manure—
Hamburg, 500 bgs.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending April 19th.

Ammonium Carbonate—
Yokohama, 10 c. £20
B. Ayres, 35
" 1 t. 40
St. Petersburg, 300 kgs. 15 cks. 531
Gutjewski, 40 30 190
Ammonium Sulphate—
Dunkirk, 20 t. £230
Cologne, 15 173
Rotterdam, 60 720
Trinidad, 15 6 c. 194
Martinique, 15 4 220
Demerara, 25 3 307
Bordeaux, 29 6 360
Arsenic—
Wellington, 1 t. 10 c. £20
Benzole—
Rotterdam, 19 c. £767

Benzole Acid—
New York, £33
Carbolic Solid—
Rotterdam, 5 t. £397
Cream of Tartar—
E. London, 4 c. £26
Melbourne, 1 t. 110
Adelaide, 10 50
Melbourne, 20 kgs. 102
Adelaide, 12 57
Brisbane, 10 70
Copper Sulphate—
Naples, 5 t. £122
Genoa, 25 1 c. 635
Treport, 10 215
Genoa, 30 666
Naples, 5 119
Hobart, 2 44
Genoa, 5 120
" 5 120
Treport, 7 1 175

Carbolic Acid—
Rotterdam, 25 cks. £80
Le Treport, 2 t. 5 c. 18
Carbolic Solid—
Valencia, 14 c. £100
Barcelona, 1 t. 140
Citric Acid—
Amsterdam, 2 kgs. £15
Hamburg, 15 c. 112
Cape Town, 1 1/2 12
Hamburg, 2 15
Monte Video, 1 ck. 36
Marseilles, 10 101
Melbourne, 10 80
Brussels, 10 74
Hamburg, 4 140
Melbourne, 20 kgs. 41
Hong Kong, 1/2 4
Melbourne, 20 138
Montreal, 2 15
Riga, 1 8
Cologne, 5 30

Caustic Soda—
New Orleans, 120 t. 3 c. £
Algoa Bay, 9
Sydney, 2 2
Caustic Potash—
Sydney, 1 t. 13 c. 1
Coal Products—
New York, 51 rults. 1
Cette, 1,008 t. 1
Dunkirk, 672 1
" 250
" 150
Caen, 146
Cette, 979
Dunkirk, 483
" 642
Rouen, 15 brls.
Odessa, 200
Kongsberg, 135 t.
Cette, 1,199 2
Tar
Karachi, 100 mlts. 1
Stockholm, 25 cks.
Bombay, 61 mlts.

Benzole Rotterdam, 64 cks. £699 " 30 pms. 426 " 39 cks. 767 " 46 dms. 30 cks. 1,142	Sodium Hypsulphite— Melbourne, 3 t. £14 Sulphur Flowers— Algoa Bay, 6 t. 15 c. £59	Sodium Bicarbonate— Melbourne, 2 t. 6 c. £21	Calcutta, 106 Cartagena, 20 Hamburg, 53 Ibrail, 20 Lisbon, 74 Malaga, 20 Malta, 10 Manzanilla, 25 New York, 699 Oporto, 45 Philadelphia, 136 Portland, 50 Port Natal, 25 bxs. Seville, 50 Valencia, 25 Vigo, 10 Montreal, 25 Callao, 20 Carthagena, U. S., 67	Malta, 4 cks. New York, 4 Bombay, 2 t. 16 c. " 2 Epsom Salts— Bombay, 7 cks. 3 bbls. Portland, 30 kgs. Rio Janeiro, 50 kgs. St. John's, 25 Glycerine— St. John's, N. F., 4 c.
Anthracene Dusseldorf, 73 cks. £445 Calais, 49 Hamburg, 16 dms. 319 Dusseldorf, 134 cks. 743 Rotterdam, 132 712	Sulphuric Acid— Hamburg, 1 t. £20 Tartaric Acid— Brisbane, 10 c. £75 Melbourne, 30 kgs. 197 Adelaide, 10 66 Montreal, 8 57 Dunedin, 5 38 Melbourne, 5 38 Adelaide, 15 35 pks. 239 " 56	LIVERPOOL. Week ending April 23rd. Alkali— Danzic, 18 cks. Antimony Regulus— Rotterdam, 5 t. 2 c. £360	Constantinople, 153 Genoa, 15 Halifax, 15 Havana, 50 La Guayra, 14 Lisbon, 12 Malta, 100 Marseilles, 20 Melbourne, 11 Montreal, 18 Para, 11 Pernambuco, 5 Philadelphia, 230 Santander, 20 Santos, 20 Stettin, 25 bxs. 20 Yokohama, 8	Guano— Havana, 499 t. 14 c. 2 q. 4 Malaga, 6 11 Gypsum— New York, 9 t. 11 c. " 4 19 Iodine— New York, 73 bbls. 4 Lead Nitrate— Rouen, 3 t. 3 c. Magnesia— Havana, 12 cks. Porto Alegre, 3 Magnesia— Antwerp, 2 cts. Rio Janeiro, 20 cts. Tampico, 1 Magnesium Calcide— Ancona, 1 c. Tampico, 1 Manure— Alexandria, 5 t. St. John's, 12 c. Antwerp, 4 16 Barbadoes, 86 5 St. Nazaire, 100 8 Oxalic Acid— Barcelona, 12 c.
Naphthalene New York, 54 pks. £184 " 26 cks. 33 Treport, 59 50 bgs. 90 Christiania, 1 cs. 12 Solvent Naphtha Ghent, 8 cks. £21 Carbolic Acid Rotterdam, 40 cks. £397 Treport, 10 18 Stettin, 25 165 Toluole Rotterdam, 19 cks. £233 Aniline Melbourne, 1 cs. £13 Creosote Salts Philadelphia, 150 t. £322	Ammonium Carbonate— Bahia, 9 c. £16 Bilbao, 10 2 q. 18 San Sebastian, 4 8 Genoa, 1 t. 10 49 Amsterdam, 1 4 7 Odessa, 1 7 36 Portland, 17 1 27 Alum Cake— Montreal, 10 t. 5 c. £52 Ammonium Muriate— Antwerp, 7 c. 1 q. £9 Asphaltum— Boston, 7 t. 10 c. £90 Ammonium Sulphate— Valencia, 66 t. £758 " 50 3 c. 1 q. 583 " 50 4 2 630 Alum— Odessa, 2 t. 1 c. £11 Salonica, 4 21 Melbourne, 1 2 Madras, 15 17 1 q. 21 Smyrna, 7 2 3 35 Wellington, 1 1 5 Cape Town, 4 16 27 Montreal, 1 11 8 Oporto, 5 2 24 Salazara, 1 2 24 Volo, 1 8 2 8 Bleaching Powder— Antwerp, 32 cks. 121 c. Baltimore, 120 Barcelona, 10 Boston, 692 Calcutta, 37 Chicago, 16 Dunkirk, 402 Genoa, 163 Ghent, 170 Hamburg, 55 Montreal, 605 New York, 96 Antwerp, 25 cts. Bombay, 5 Bordeaux, 35 Boston, 597 Hamburg, 29 Lisbon, 15 Malaga, 10 Montreal, 74 pks. Newfairwater, 57 New York, 233 20 Philadelphia, 14 50 tcs. Rotterdam, 14 30 Rouen, 94 Trieste, 30 Bone Waste— Rouen, 2 t. £15 Boracic Acid— Rotterdam, 1 t. 2 c. 2 q. £28 Bone Ash— Stettin, 174 t. 1 c. 1 q. £870 Brimstone— New York, 99 t. 10 c. £415 Rotterdam, 11 16 3 q. 80 Borax— San Sebastian, 5 c. 3 q. £9 Stettin, 19 3 29 Rouen, 29 t. 6 816 Malaga, 4 2 7 Christiania, 3 16 115 Caustic Soda— Antwerp, 10 dms. 29 bbls. Barcelona, 230 40 Bilbao, 16	Charcoal— Hamburg, 150 t. £750 Rotterdam, 50 5 c. 200 Hamburg, 55 2 286 Chlorate— New York, 5 t. £163 Carbolic Solid— Amsterdam, 8 c. £52 New York, 5 t. 1 q. 421 Copperas— Santos, 1 t. 9 c. 2 q. £5 Calcium Chloride— New York, 4 t. 19 c. £10 Sydney, 10 22 Copper Sulphate— Nantes, 62 t. 2 c. 1 q. £1,401 Ancona, 6 138 Barcelona, 20 3 420 Bilbao, 5 3 419 Constantinople, 12 2 10 Bordeaux, 10 17 1 288 Genoa, 15 11 3 370 Dunkirk, 4 19 1 180 Genoa, 17 1 342 Leghorn, 1 11 29 Marseilles, 10 3 176 Genoa, 19 4 1 360 Trieste, 5 1 106 Barcelona, 11 5 3 211 Tarragona, 15 1 2 265 Leghorn, 14 2 14 Genoa, 35 3 1 694 " 6 10 151 Vera Cruz, 1 18 47 Barcelona, 10 2 1 221 Alicante, 1 28 Almeria, 1 15 32 Tarragona, 2 36 Barcelona, 25 5 2 610 Bilbao, 10 1 240 Bordeaux, 123 7 1 2,560 Brindisi, 5 12 105 Genoa, 153 3 2,860 Leghorn, 8 7 2 139 Venice, 33 19 2 635 Passages, 10 2 193 Bilbao, 5 6 106 Nantes, 53 6 1,325 Rouen, 41 13 905 Valencia, 15 2 1 351 Genoa, 52 15 2 1,359 Venice, 13 15 3 290 Disinfectants— Calcutta, 30 cks. 32	Manure— Alexandria, 5 t. St. John's, 12 c. Antwerp, 4 16 Barbadoes, 86 5 St. Nazaire, 100 8 Oxalic Acid— Barcelona, 12 c. Pitch— Catania, 129 cks. Potassium Chlorate— Naples, 10 c. New York, 7 10 " 12 10 San Juan, 1 5 Brindisi, 10 Pagages, 8 New York, 15 Shanghai, 1 5 New York, 10 Alexandria, 1 Copenhagen, 2 10 Genoa, 10 Hamburg, 1 13 New York, 2 10 Hamburg, 3 Phosphate— Hamburg, 10 t. Potassium Carbonate— Rio de Janeiro, 11 c. Montreal, 2 t. 16 New York, 9 8 Potassium Bichromate— Ancona, 9 c. 1 q. Barcelona, 10 t. 17 Leghorn, 4 Vigo, 5 Panama, 15 2 Potashes— Monte Video, 11 c. Melbourne, 3 1 19 Salt— Bakana, 20 t. Baltimore, 650 Barbadoes, 20 Batanga, 5 Bereby, 10 Boma, 15 Bonny, 90 Brass, 50 Bruges, 103 Cameroon, 50 Cape Lopez, 10 Cleveland, 65 Fernando Po, 50 4 c. Hamburg, 80 Miramichi, 301 New York, 215 Old Calabar, 149 10 Antwerp, 218 Beaver Point, 8 Bomby, 1 Brisbane, 250 Calcutta, 3,649 Copenhagen, 34 Lagos, 200 Manaos, 42 16 Melbourne, 220 Montreal, 200 New York, 80 Para, 218	

Pernambuco,	180	10 cs.
Portland,	472	
Rotterdam,		
Santos,	175	
Sierra Leone,	190	
Sydney,	12	
Valparaiso,	50	
Prince Edward Island,	152 t.	6 c.
Quebec,	1,110 t.	9 c.
St. John, N.B.,	125	
San Francisco,	59	
Shediac,	229 1/2	
Sherbro,	99 1/2	
Sierra Leone,	279 1/2	
Trinidad,	42	
Tuborg,	698	
Valparaiso,	100	

Soda Ash—

Baltimore,	288 cks.	1,114 tcs.
Barcelona,	40	
Boston,	53 1/2	27 1/2
B. Ayres,	200	brls.
Constantinople,	100	
Coquimbo,	16	
Corfu,	89	
Genoa,	52	
Ibrail,	20	
Lisbon,	106	
Madrid,	28	
Oporto,		25 tcs.
Philadelphia,	245 cks.	
Santos,	10	
Sydney,		40 brls.
Alicante,	2	
Baltimore,	232	
Boston,	1,157	350 tcs.
Canada,		
Corfu,	11	
Genoa,	35	
Leghorn,	102	
Monte Video,	20	
New York,	808	
Philadelphia,	44	
Rio Janeiro,	50	
Smyrna,	100	
Varna,	100	

Sodium Silicate—

Alexandria,	10 cks.
Bilbao,	16
Carthagena,	6
Odessa,	28
Para,	5
Venice,	16

Soda Crystals—

Boston,	750 cks.
Constantinople,	50 brls.
Hamburg,	100 bgs.
Malta,	50
New York,	750 cks.
St. John's, N.B.,	225 brls.
St. John's, Nfld.,	45 kgs.
Alexandria,	40 brls.
Boston,	500 kgs.
Callao,	60
Charlotte Town,	15 cks.
Constantinople,	50
East London,	30
New York,	420
Rotterdam,	20
St. John's, Nfld.,	50
Wellington,	10

Sodium Bicarbonate—

Antwerp,	20 kgs.
Astoria,	100
Auckland,	32
Copenhagen,	25
Danzic,	24 brls.
Dunedin,	100
Fairwater,	240
Genoa,	60
Gothenburg,	4 cks.
Hamburg,	20
Havre,	14
Lisbon,	30
Melbourne,	74
Rotterdam,	30
St. John's, N.B.,	50
Stettin,	28
Wellington,	170
Antwerp,	1
Canda,	775
Charlotte Town,	50
Melbourne,	200
Rouen,	5 t. 8 c.
Trieste,	70

Soda Salts—

Montreal,	6 t. 18 c.
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Saltcake—

Baltimore,	31 t. 1 c.
Ghent,	100
Boston,	100
Philadelphia,	37 t. 15 c.

Sodium Biboate—

Antwerp,	2 c. 1 q.
Palermo,	4 3
Rotterdam,	6 1

Sodium Sulphate—

Lytleton,	5 t. 1 c.
Wellington,	7 14

Sulphur—

Boston,	50 t.
"	50 2 c.
"	25 1
San Luis,	13 t. 10 c. 3 q.
Lisbon,	7 7 1
Boston,	50 2
"	50 2

Sulphuric Acid—

New York,	1 t. 2 c. 2 q.
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Sal Acetos—

Trieste,	4 c. 3 q.
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Salammoniac—

Rouen,	1 t. 10 c.
Melbourne,	17 3 q.
Montreal,	1
Alexandria,	10
Syria,	4 3
Beyrout,	1 1
Bilbao,	8
Boston,	5 1
Calcutta,	3 19 1
Trieste,	1 1
Valparaiso,	6 1
Alexandretta,	4

Sheep Dip—

East London,	1 t. 10 c.
Cape Town,	2 10
Natal,	1 10

Saltpetre—

Almeria,	12 c.
Barcelona,	3 t. 11 1 q.
Montreal,	5
Syria,	1 18 2
Portland,	4 7 3
Piræus,	7 10
Pernambuco,	2
Halifax,	10
Montreal,	1

Sodium Nitrate—

Odessa,	2 t. 11 c.
Fiume,	6 6 3
Alicante,	3 16 1
Malaga,	6 7
Valencia,	3 2 3

Sheep Wash—

New York,	2 t. 10 c.
Monte Video,	7
Mossel Bay,	15

Tannic Acid—

Rio de Janeiro,	1 c.
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Tin Crystals—

Barbadoes,	17 c. 1 q.
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Zinc Chloride—

Boston,	1 t. 5 c. 1 q.
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TYNE.

Week ending April 24th.

Alkali—

Christiania,	5 t. 8 c.
New York,	12 17
Rotterdam,	1 19
Carthagena,	16 14
New York,	100 8

Alum—

Carthagena,	5 t. 9 c.
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Antimony—

New York,	30 t.
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Barytes Carbonate—

Antwerp,	10 t.
Stettin,	164 5 c.
Copenhagen,	2

Baryta Chlorate—

Hamburg,	5 c.
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Bleaching Powder—

Gothenburg,	10 t. 18 c.
Antwerp,	9
Hamburg,	36 9
Dunkirk,	20 4
Passages,	20 4
New York,	140 6
Rotterdam,	22 2
Stettin,	222 15
Riga,	11 4
Quebec,	18 16
Aarhus,	9 19
Horsens,	1 2
Carthagena,	3 4
Copenhagen,	19 2
Libau,	20 5

Caustic Soda—

Gothenburg,	2 t. 4 c.
Antwerp,	5 3
Passages,	29
New York,	100 2
Quebec,	14 10
New York,	205 4

Gypsum—

New York,	72 t. 7 c.
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Litharge—

Stettin,	7 t. 19 c.
Quebec,	35 4

Magnesia—

Hamburg,	9 c.
Genoa,	15

Napthalene—

Riga,	25 t. 7 c.
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Potassium Chlorate—

New York,	10 t.
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Pitch—

Copenhagen,	5 t.
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Phosphorus—

Malmo,	4 c.
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Sulphur—

Hamburg,	1 t.
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Sodium Sulphate—

Gothenburg,	10 t. 4 c.
Quebec,	1
Libau,	20 11

Soda Ash—

Gothenburg,	5 t. 4 c.
Antwerp,	6 12
Hamburg,	10 13
Venice,	10 14
New York,	115 1
Stettin,	10
Riga,	3 4
New York,	100 11

Soda—

Aarhus,	7 t. 6 c.
Frederikshavn,	12 15
Gothenburg,	4 18
Christiania,	5 16
"	5 16
New York,	413
Rotterdam,	5 1
Quebec,	34 17
Copenhagen,	16 2
New York,	154

Sodium Chlorate—

Rotterdam,	1 t. 2 c.
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Sodium Hyposulphite—

Quebec,	2 t. 5 c.
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HULL.

Week ending Apr. 22nd.

Alkali—

Konigsberg,	11 drums.
New York,	191 cks.
Trieste,	19

Barytes—

Marseilles,	25 t.
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Bleaching Powder—

Christiania,	34 cks.
Stettin,	135

Chemicals (otherwise undescribed)

Amsterdam,	20 cks. 32 pks.
Bergen,	3
Bari,	50
Christiania,	5 1 cs.
Copenhagen,	6 1
Constantinople,	50
Dunkirk,	454
Danzig,	50 1
Gothenburg,	5 36
Ghent,	2
Genoa,	5 22 26
Helsingfors,	6
Hamburg,	20 11 159
Konigsberg,	10
Lisbon,	1 5
Libau,	5
Leghorn,	5
Marseilles,	50
New York,	54 35
Odessa,	384 80
Rotterdam,	202 40 70
Reval,	5
Stettin,	9 5
Stockholm,	9 1
Trieste,	31 50

Caustic Soda—

Danzig,	5 drms.
Libau,	70

Dyestuffs (otherwise undescribed)

Antwerp,	1 cks.
Hamburg,	1 1 cs. 2 drums.
Rotterdam,	7 1 1
Reval,	3
Manure—	
Ghent,	647 bgs.
Hamburg,	479
Rotterdam,	734

Pitch—

Genoa,	162 t.
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Salt—

Bergen,	1 cks.
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Tar—

Amsterdam,	10 cks.
Bergen,	2
Drontheim,	10
Gothenburg,	155
Hamburg,	5
Stettin,	6
Odessa,	200

GLASGOW.

Week ending April 24th.

Ammonium Sulphate—

Trinidad,	114 t. 18 c.
Demerara,	10 19
"	12 13

Bleaching Powder—

Brisbane,	13 t. 1 c.
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Cream of Tartar—

Brisbane,	22 c.
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Caustic Soda—

New York,	204 c.
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Chemicals (otherwise undescribed)

Penang,	3 t. 8 1/2 c.
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Dyestuffs—

Logwood,	
Dunedin,	2 t.

Magnesium Silicate—

Penang,	2 t. 1 c.
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Potassium Bichromate—

Italy,	18 t. 24 1/2 c.
Rotterdam,	13 cks.
"	16
New York,	496 c.
Antwerp,	322 1/2
Stockholm,	2 cks.
Karachi,	1 t. 6 c.

Pitch—

Sable D'Ohne,	1,000 t.
St. Nazaire,	900

Paraffin Wax—

Italy,	14 1/2 c.
Dunedin,	48 1/2 11 lbs.

Soda Ash—

Baltimore,	1,817 c.
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Sodium Silicate—

Sydney,	
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Sodium Bichromate—

Naples,	15 t. 5 c.
New York,	506

Sulphuric Acid—

Bombay,	4 t. 10 c.
Karachi,	167

Tartaric Acid—

Brisbane,	
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Tar—

St. John's, N. F.,	
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GRIMSBY.

Week ending April 19th.

Alkali—

PRICES CURRENT.

WEDNESDAY, APRIL 30, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

as stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.		£	s.	d.
5 % and 40 %	per cwt	7/3	& 12/6	Lime, Acetate (brown)	per ton	13	15 0
Glacial	"	67/6		" (grey)	per ton	13	15 0
S.G., 2000°	"	0	12 9	Magnesium (ribbon and wire)	per oz.	0	2 3
82 %	nett per lb.	0	0 6 1/2	" Chloride (ex ship)	per ton	2	5 0
"	"	0	0 3 1/4	" Carbonate	per cwt.	1	17 6
(Tower Salts), 30° Tw.	per bottle	0	0 8	" Hydrate	"	0	10 0
(Cylinder), 30° Tw.	"	0	2 11	" Sulphate (Epsom Salts)	per ton	3	0 0
30° Tw.	per lb.	0	0 2	Manganese, Sulphate	"	18	0 0
"	"	0	0 1 1/4	" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
"	nett	0	0 4	" Ore, 70 %	per ton	4	10 0
"	"	0	1 2 1/2	Methylated Spirit, 61° O.P.	per gallon	0	2 2
ic (fuming 50 %)	per ton	15	10 0	Naphtha (Wood), Solvent	"	0	3 10
(monohydrate)	"	5	10 0	" Miscible, 60° O.P.	"	0	4 7 1/2
(Pyrites, 168°)	"	3	2 6	Oils :—			
(" 150°)	"	1	8 0	Cotton-seed	per ton	22	10 0
(free from arsenic, 140/145°)	"	1	10 0	Linseed	"	25	0 0
ous (solution)	"	2	15 0	Lubricating, Scotch, 890°—895°	"	7	5 0
(pure)	per lb.	0	1 0 1/2	Petroleum, Russian	per gallon	0	0 5 1/2
"	"	0	1 3	" American	"	0	0 5 1/2
White powdered	per ton	13	0 0	Potassium (metal)	per oz.	0	3 10
se lump)	"	4	15 0	" Bichromate	per lb.	0	0 4
Sulphate (pure)	"	5	0 0	" Carbonate, 90% (ex ship)	per ton	19	0 0
" (medium qualities)	"	4	10 0	" Chlorate	per lb.	0	0 4 1/2
m	per lb.	0	15 0	" Cyanide, 98%	"	0	2 0
, 880°=28°	per lb.	0	0 3	" Hydrate (Caustic Potash) 80/85 %	per ton	22	10 0
=24°	"	0	0 1 1/4	" " (Caustic Potash) 75/80 %	"	21	10 0
Carbonate	nett	0	0 3 1/2	" " (Caustic Potash) 70/75 %	"	20	15 0
Muriate	per ton	23	0 0	" Nitrate (refined)	per cwt.	1	2 6
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-	" Permanganate	"	4	2 6
Nitrate	per ton	40	0 0	" Prussiate Yellow	per lb.	0	0 9 1/2
Phosphate	per lb.	0	0 10 1/2	" Sulphate, 90 %	per ton	9	10 0
Sulphate (grey), London	per ton	11	6 3	" Muriate, 80 %	"	7	15 0
" (grey), Hull	"	11	2 6	Silver (metal)	per oz.	0	3 10 1/2
Oil (pure)	per lb.	0	0 11	" Nitrate	"	0	2 7
Salt	"	0	0 9	Sodium (metal)	per lb.	0	4 0
"	per ton	75	0 0	" Carb. (refined Soda-ash) 48 %	per ton	6	10 0
(tartar emetic)	per lb.	0	1 1	" " (Caustic Soda-ash) 48 %	"	5	5 0
(golden sulphide)	"	0	0 10	" " (Carb. Soda-ash) 48 %	"	5	15 0
Chloride	per ton	8	0 0	" " (Carb. Soda-ash) 58 %	"	6	17 6
Carbonate (native)	"	3	15 0	" " (Soda Crystals)	"	2	15 6
Sulphate (native levigated)	"	45/-	to 75/-	" Acetate (ex-ship)	"	15	15 0
z Powder, 35 %	"	5	0 0	" Arseniate, 45 %	"	11	0 0
Liquor, 7 %	"	2	10 0	" Chlorate	per lb.	0	0 6 1/2
le of Carbon	"	13	0 0	" Borate (Borax)	nett, per ton	30	0 0
n Acetate (crystal)	per lb.	0	0 6	" Bichromate	per lb.	0	0 3
Chloride	per ton	2	2 6	" Hydrate (77 % Caustic Soda)	per ton	11	10 0
ay (at Runcorn) in bulk	"	17/6	to 35/-	" " (74 % Caustic Soda)	"	10	10 0
Dyes :—				" " (70 % Caustic Soda)	"	9	0 0
ne (artificial) 20 %	per lb.	0	0 9	" " (60 % Caustic Soda, white)	"	8	10 0
ta	"	0	3 9	" " (60 % Caustic Soda, cream)	"	8	5 0
r Products				" Bicarbonate	"	6	0 0
cene, 30 % A, f.o.b. London	per unit per cwt.	0	1 5	" Hyposulphite	"	5	10 0
, 90 % nominal	per gallon	0	3 6	" Manganate, 25 %	"	9	0 0
50/90	"	0	2 7	" Nitrate (95 % ex-ship Liverpool)	per cwt.	0	8 0
ic Acid (crystallised 35°)	per lb.	0	0 9	" Nitrite, 98 %	per ton	28	0 0
" (crude 60°)	per gallon	0	2 3	" Phosphate	"	15	15 0
te (ordinary)	"	0	0 2 1/2	" Prussiate	per lb.	0	0 7 1/2
(filtered for Lucigen light)	"	0	0 3	" Silicate (glass)	per ton	5	7 6
Naphtha 30 % @ 120° C.	"	0	1 3	" " (liquid, 100° Tw.)	"	3	17 6
Oils, 22° Tw.	per ton	3	0 0	" Stannate, 40 %	per cwt.	2	0 0
f.o.b. Liverpool or Garston	"	1	8 0	" Sulphate (Salt-cake)	per ton	1	12 0
t Naphtha, 90 % at 160°	per gallon	0	1 9	" " (Glauber's Salts)	"	1	10 0
n Oils (crude)	"	0	0 2 1/2	" Sulphide	"	7	15 0
Chili Bars)	per ton	49	0 0	" Sulphite	"	5	5 0
ulphate	"	25	0 0	Strontium Hydrate, 98 %	"	8	0 0
xide (copper scales)	"	52	10 0	Sulphocyanide Ammonium, 95 %	per lb.	0	0 8
(crude)	"	30	0 0	" Barium, 95 %	"	0	0 5 1/2
(distilled S.G. 1250°)	"	55	0 0	" Potassium	"	0	0 8
"	nett, per oz.	8 1/4	d. to gd.	Sulphur (Flowers)	per ton	7	15 0
hate (copperas)	per ton	1	10 0	" (Roll Brimstone)	"	6	0 0
hite (antimony slag)	"	2	0 0	" Brimstone : Best Quality	"	4	5 0
et) for cash	"	14	0 0	Superphosphate of Lime (26 %)	"	2	10 0
large Flake (ex ship)	"	15	10 0	Tallow	"	25	10 0
etate (white ")	"	23	5 0	Tin (English Ingots)	"	96	10 0
" (brown ")	"	18	5 0	" Crystals	per lb.	0	0 6 1/2
arbonate (white lead) pure	"	19	0 0	Zinc (Spelter)	per ton	21	0 0
rate	"	22	5 0	" Chloride (solution, 96° Tw.	"	6	0 0

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Notices.

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

TO TAR DISTILLERS AND OTHERS.

THE Gas and Water Committee of the Ulverston
Local Board invite Tenders for the purchase of the surplus TAR produced at the Gas Works, Ulverston, for a period of one or more years, commencing the 1st July next.

Sealed Tenders addressed to the Chairman of the Gas and Water Committee and endorsed "Tender for Tar," must be sent in not later than the 29th inst.

Further information can be obtained on application to the undersigned in writing.

JNO. SWAN,

Engineer and Manager.

SOCIETY OF CHEMICAL INDUSTRY.

LONDON SECTION.

AN ordinary meeting of the section was held on Monday, May 5th at Burlington House, Mr. David Howard in the chair. Mr. William Webster's paper on the electrical treatment of sewage having been postponed *sine die*. Mr. Watson Smith first communicated a note on a reaction for distinguishing gallic from tannic acid that had recently appeared in Liebig's *Annalen*. Treatment with phenylhydrazine and caustic soda develops a blue colour with tannic acid, and a golden yellow with gallic acid. The former fades to a yellowish tint on standing. The reaction having been shown satisfactorily, excited some comment, and in reply to questions Mr. Watson Smith said that at present it was a purely qualitative test, and that the precise change occurring was not yet worked out. The same author then read his paper on the "Chemical Aspects of the Dinsmore Process." The process was described, and its advantages in the manufacture of coal-gas pointed out in a paper read before the Liverpool section of the Society in 1889, and may be briefly described as a method of enriching the gas at the expense of the tar. The idea is old, a patent of which the main object appears to have been the disposal of an objectionable by-product, viz., tar, having been taken out in 1830; since then others have been granted, but have not achieved success. Even the original Dinsmore process before the modifications due to Mr. Carr and Mr. Pritchard were introduced, the plan of running the tar direct into the carbonising retort was productive of troublesome stoppages. The improved method now worked consists in passing the crude gas before the tar accompanying it has been condensed, with a heated retort, thus gasifying much of the tar and enriching the gas in illuminants. While ordinary town gas containing one third of Dinsmore gas has a composition of 50.60 % of H, 33.39 % of CH₄, and 4.37 % of olefines, pure Dinsmore gas contains 43.98 % H, 44.34 % of CH₄, and 6.76 % of olefines. The latter is also free from carbon dioxide, and gains in illuminating power from this cause also. Distinguishing the Dinsmore gas made at the Widnes gasworks as A, and the town gas containing one third of Dinsmore gas as B, the following contrasts are observed:—

(1). Composition of the tars obtained.

	A.	B.
Water	1.1 %	7.1 %
Light oils	1.3 "	5.4 "
Creosote oils	16.5 "	17.8 "
Anthracene oils....	12.1 "	8.6 "
Pitch	69.0 "	61.1 "

Sp. gr. 1.157 , , 1.150 , ,

The small quantity of light oils and the fact that the creosote oil yielded 2.5 % of tar acids in the case of A, while B gave 5.4 % are very significant. From A, 0.79 % of real anthracene, while from B only 0.32 % can be obtained. The pitch from A had a softening point of 67.5°C., and a melting point of 94°C., while the figures for B were 68°C. and 96°C. respectively; the tensile strength of that from A was 150 lbs. and from B 132 lbs. per sq. in. The difference in the quality and yield of gas is very considerable—9,000 c. ft. of 15 c. p. for B, as against 9,800 c. ft. of 20-21 c. p. for A. The industrial importance of the process appears when the growing scarcity of naphthalene is considered. The increase in illuminating power may be ascribed to the breakdown of benzene into acetylene, and the reduction of phenols to the corresponding aromatic hydrocarbons. Bethelot has proved that the former reaction does occur, and the latter can even be used to prepare benzene, free from thiophene, and is practicable as a lecture experiment.

In opening the discussion, the Chairman pointed out the serious result to colour makers of the scarcity of aromatic hydrocarbons that

the general adoption of the process would entail, but welcomed it as being a step in the direction of allowing gas engineers and chemists to regulate the quality and output of gas and its by-products, according to the current market prices of the several commodities. Professor Foster, having studied the process chiefly from the point of view of the increased luminosity of the gas, gave the results of his experience, and ascribed the gain in illuminating power to the breaking up of hydrocarbons of the paraffin series into those of the olefine series and free hydrogen. A tangible advantage was that cheaper coal could be used, even such as was not generally looked upon as of gas-making quality. Mr. Scudder pointed out that the greater illuminating power of Dinsmore gas might well be due to its freedom from CO² and N, and the probable presence of benzene vapour. Dr. C. Alder Wright remarked on the discrepancy between the sp. gr. of the gas as given by Prof. Foster and its composition. Prof. Foster, in replying, touched on the weak point in the comparison instituted between the two kinds of gas, as the coal used in their production was not identical.

The hour being late, the paper on the chemistry of hypochlorite Bleaching, by Messrs. Cross and Bevan was postponed, and Mr. Tyrer read a note by an American member, Mr. Martin L. Griffin, on "Moisture in Paper Pulp." The author having commented on the extremely vague and unsatisfactory nature of the term "air-dried," suggested as a standard resulting from very numerous observations during all sorts of weather, the allowance of 6% of water on the undried pulp, i.e. 6.38% on the dried pulp, and states that it has been largely accepted by manufacturers. The difficulty of making a fair deduction, based on the determination of moisture in a sample drawn from the outer portion of a bale packed dry, and then exposed to damp air, thus absorbing water in its exterior layers, having been pointed out by Dr. Wright, the meeting was adjourned.

MANCHESTER SECTION.

The sixth meeting of the present session of this Society was held last evening at the Victoria Hotel, Dr. Bailey (Owens College) presiding. Dr. Liebmann read a paper on pure aniline and its homologues. He said that since the discovery of aniline in 1826 it had formed the basis of much investigation, but there were always new facts connected with it cropping up. On the strength of scientific research he had devised a method for the analysis of these products, which he hoped to further elucidate. A brief discussion took place upon the paper, and the thanks of the meeting were accorded to Dr. Liebmann. Mr. J. Carter Bell followed with a paper on the liability of certain oils to spontaneous combustion. He said that for the past four months he had been making a great many experiments upon oils, to see whether some definite conclusion could be arrived at as to the liability of certain oils to show the phenomenon of spontaneous combustion. He was sorry to say that the results were not very concordant. Mr. Bell described in detail the experiments he had made with various oils and wools, and gave the results obtained in each. There was, he said, amongst some manufacturers an opinion that white wools when greased were more liable to heat than dyed wools. There was some reason to think that that might be so, but his experiments proved exactly the reverse. They were quite opposed to the theory that undyed wools would heat sooner than dyed wools, and light wools sooner than dark. He had never been able to get wool to burst into a flame, it always smouldered away. He had made inquiries as to whether people had ever seen a case of spontaneous combustion—the whole thing bursting into a flame—and he did not think that such cases had really been seen in mills. The experiments showed, however, the great importance of thoroughly sweeping up and clearing all places where wool was kept. A discussion followed, and the meeting concluded with the usual votes of thanks.

SCOTTISH SECTION.

The usual monthly meeting of this section was held in the rooms of the Philosophical Institution, Edinburgh, on the evening of Tuesday, Mr. J. H. Beilby in the chair. The papers of the occasion consisted of the second instalment of Dr. J. B. Readman's exposition of the manufacture of phosphorus, in the first part of which the process was characterised as a costly one, both from wear and tear of plant and loss of material at various stages, and an account of the manufacture of dynamite and other explosives by Mr. G. MacRoberts, which was continued. Dr. Readman's second reading entered into

details of some of the experiments carried out by him with the object of endeavouring to simplify the process of phosphorus manufacture. These experiments have spread over a period of three years, and have proved the possibility of superseding the employment of sulphuric acid altogether, by the use of silica and abandoning distillation in retorts. Specimens of waste slags illustrating the various experiments were exhibited, and typical results were given in considerable detail in every case. The patents taken out for the simplification of the manufacture were discussed as far as they bore on the present instalment of the paper. Mr. MacRoberts entered at considerable detail into the comparative energies of the now numerous and various explosives, from blasting gelatine, the most powerful of all, down to the milder forms of gunpowder. The superiority of the new explosives, in other respects than that of energy, was dwelt upon, emphasis being put on the comparative powerlessness (in some cases) of water or moisture to destroy the explosive faculty, and on the comparative safety which, in the nitro glycerine compounds, commonly governs the act of explosion itself.

ENERGY OF EXPLOSIVES.

QUANTITY OF EXPLOSIVE USED IN MORTAR—10 GRAMMES.

Name of Explosive.	Ingredients.	Percentage.	Energy in Foot-pounds.
1. No. 1 Dynamite	Kieselguhr	25	100
	Nitro-Glycerine	75	
2. No. 1 Blasting Gelatine	Nitro-Glycerine	98	1,100
	Nitro-Cotton	2	
3. Nitro-Glycerine	Nitro-Glycerine	100	1,200
4. Gelatine Dynamite	Nitro-Glycerine, 52.3% } Nitro-Cotton, 7.7% }	80	
	Nitrate of Potash	14	1,215
	Wood Meal	0	
5. Gelignite	Nitro-Glycerine, 94.8% } Nitro-Cotton, 5.2% }	60	
	Nitrate of Potash	28	1,011
	Wood Meal	12	
6. Detonator Mixture	Chlorate of Potash	20	576
	Fulminate of Mercury	80	
7. Fulminate of Mercury	Fulminate of Mercury	100	37
8. Ammonia Powder	Nitrate of Ammonia	91.28	
	Wood Meal	5.79	790
	Sulphur	3.00	
9. Nitrate of Ammonia Powder	Nitrate of Ammonia	69.83	880
	Picric Acid	30.17	
10. Nitrate of Potash and Picric Powder	Nitrate of Potash	53.55	600
	Picric Acid	46.45	
11. Nitrate of Soda and Picric Powder	Nitrate of Soda	78.13	560
	Picric Acid	21.87	
12. Nitrate of Soda and Picric Powder	Nitrate of Soda	49.12	680
	Picric Acid	50.88	
13. Nitrate of Soda and Picric Powder	Nitrate of Soda	44.59	670
	Picric Acid	55.41	
14. Nitrate of Ammonia and Ferrocyanide of Potassium	Nitrate of Ammonia	72.29	370
	Ferrocyanide of Potassium	27.71	
15. "Securite"	Nitrate of Ammonia	82.64	770
	Dinitrobenzol	17.36	
16. Nitrate of Potash and Dinitrobenzol	Nitrate of Potash	66.79	210
	Dinitrobenzol	33.21	
17. Chlorate of Potash and Dinitrobenzol	Chlorate of Potash	70.86	311
	Dinitrobenzol	29.14	
18. Chlorate of Potash and Paraffin	Chlorate of Potash	59.40	670
	Paraffin	40.60	
19. Chlorate of Potash and Dinitrocotton	Chlorate of Potash	53.26	900
	Dinitrocotton	46.74	
20. Dinitrocotton	Dinitrocotton	100	350
21. Maxim's Powder	Nitrate of Potash	78.18	
	Sulphur	10.40	
	Paraffin	11.42	
22. Gunpowder	Gunpowder, RLG ²		370
23. Gunpowder	Gunpowder, RLG ²		347
24. Gunpowder	Gunpowder, RLG ²		361
25. Gunpowder	Gunpowder, Brown, C		374
	Ferrocyanide of Potassium	82.06	
26. Vul Powder, Blasting	Nitrate of Potash	4.78	400
	Solid Paraffin	1.14	
	Peroxide of Iron	12.02	
	Charcoal	82.0	
27. "Roburite"	Nitrate of Ammonia	16.7	950
	Dinitrobenzol	1.7	
	Moisture, &c.	50.90	
	Gun Cotton	47.48	
28. Tonite	Nitrate of Barium	none	530
	Nitrate of Potash	78	
	Carbonate of Soda	1.54	
	Moisture	59.60	
29. "Potentite"	Gun Cotton	36.80	240
	Nitrate of Potash	2.78	
	Moisture		
30. Gunpowder (for cannon)	Gunpowder		400

At the close, thanks were awarded to both gentlemen.

THE USE OF NITRIC ACID FOR THE PREPARATION OF CHLORINE.

FROM time to time the chlorine manufacturer has been assailed with rumours of new processes that were to revolutionise the trade. One of these rumours is now current, and, if it is to be believed, the problem of the economical use of nitric acid in the preparation of chlorine has at length been solved by Messrs. Davis Bros., of Manchester, who have just taken out a batch of patents on the subject. The various reactions that take place between nitric and hydrochloric acids have long been known, and the student of Gmelin is surprised when he considers how little has been added in recent years to our knowledge in this direction. The difficulties in the way of a nitric-acid chlorine process are mainly difficulties of engineering, and are such as the mere chemist is not likely to overcome. Since the days of Dunlop no very serious attempt was made to surmount these obstacles, till Taylor in 1844 took out his patent for the preparation of chlorine gas, and the syndicate which supported him erected an experimental plant at Bristol. That this was not an unqualified success will surprise no one who has studied the matter. Taylor had forgotten to deal with the water formed during the reactions, and, presumably, had forgotten, like Dunlop, to calculate how much vitriol would be required to absorb the oxides of nitrogen produced by the decomposition. Moreover, his experimental plant was erected in such a manner that the very elements of chemical construction were conspicuous only by their absence.

The process patented by Donald in 1887 has perhaps seen scarcely so much light as even that of Taylor. The patentee has made two steps in the right direction—by effecting the decomposition of the hydrochloric acid by nitric acid in the presence of sulphuric acid in order to eliminate the water of the reaction, and in using cold dilute nitric acid as an absorbent for the nitrogen oxides. It is rather curious that in their specifications both Taylor and Donald omit all recognition of the air in the furnace gases, which must needs be an important factor in a process which is essentially one of oxidation and reduction. Donald's process was worked for some months on a small scale at Widnes, but although it had the resources and the energy of the house of Muspratt behind it, the results were not such as to give either it or its inventor a permanent abiding place in that salubrious town. The single fact that Donald proposes to work his gases through columns of liquid equal in the aggregate to some 40 feet of water pressure, will provide much food for the reflective mind that appreciates the difficulty of constructing and connecting vessels to withstand the corrosive action of the various gases and liquids with which they will have to come into contact. Messrs. Davis see their way to avoid this stumbling-block, and also declare the possibility of dispensing with the refrigerating apparatus that plays a prominent part in the Donald process. It remains to be seen what will be their measure of success.

THE BAKU PETROLEUM WELLS.

WRITING from Batoum, on March 8th last, Mr. D. R. Peacock, the British Consul at that port, deals with the statements made about the alleged threatened exhaustion of the Baku petroleum wells. To the multitudes of people capitalists and labourers employed the exhaustion of the wells would be an irreparable calamity. However, so far as the yearly quantities of crude oil yielded during the last decade may serve as a criterion, the Baku petroleum fields cannot be said to show signs of exhaustion. What is presumably meant by people asserting the contrary is that, on the whole, within the comparatively limited area of the territory thoroughly explored and actually yielding oil, in order to reach the oil-bearing strata wells now-a-days have to be sunk to a considerably greater depth than formerly. No local well owner denies this. The question of exhaustion might thus be resolved on technical and commercial grounds respectively into the question of increased difficulties encountered in boring operations, and that of the profitableness or otherwise of carrying on such operations. The technical difficulties at present are not insurmountable, and, as to the commercial side of the matter, it must be admitted that the production of crude oil, owing to the rise in the price of that article, proved a more lucrative business in 1889 than previously. Occasional deficiencies of supply at Batoum, or the rise of prices for petroleum exports, may be correctly ascribed to the greater demand for these products. The quantity of crude oil produced in 1888 was 2,580,000 tons; in 1889 it was 3,306,000 tons. Shipments from Baku and Batoum were in 1888 1,741,958 tons; in 1889, 2,413,170 tons, or an increase in favour of 1889 in the production of crude oil of above 28%, and in the total shipments of above 37%. At present there is, therefore, no ground for alarm, and should the limited territory of the Apsheron, where borings are actually being carried on, prove insufficient, there are other petroleum fields along the Caspian as yet not explored, because there has not yet been necessity for so doing. When it does come capitalists

will readily turn their attention to the new fields. The crisis is n likely to come soon. At the present time, besides the many still productive pumping wells near Baku, there are three fountains at the place spouting with unabated force, and yielding daily above 5,000 tons. With reference to shipping, Mr. Peacock says that the number of tank boats engaged in carrying petroleum in bulk at Batoum numbered in 1889 28, of which 22 were under the British flag, 3 German, 2 under Russian, and 1 under Belgian. The United States have, it said, about 30 boats actually engaged in the trade in America, so it evident that the chances of the Caucasian petroleum industry in competing with that of America must materially diminish.

A FERTILIZER DECISION IN PHILADELPHIA

THE case of Heller et al. vs. Cadwalader (Collector of the port) was tried before Judge McKenna in the United States Circuit Court of Philadelphia on April 14th and 15th, and resulted in a verdict for the plaintiff.

The suit was brought by the plaintiffs against the Collector of the port of Philadelphia to recover the amount of duty paid by them under protest, on an importation of 50 tons manure salt imported by them on the ship Cuba in May, 1888. The case is in all respects similar to the one brought by the plaintiffs against the collector of the port of New York, and which was tried before Judge Lacombe on May 22nd, 1889, and which also resulted in a verdict for the plaintiffs.

The plaintiffs contend that the manure salt imported by them and which contains 90 to 98% sulphate of potash is entitled to free entry under the provisions of the free list for "guanoses, manures, and all substances expressly used for manures." The defendant claimed that under the Treasury ruling of August 2nd, 1870 (§ 715), concerning "sulphate of potash," this importation of manure salt was dutiable at 20% ad valorem. The Treasury agents have been assiduously questioning all the importers of sulphate of potash and some of the chemical manufacturers who, during the past few years, have bought this article for use as a raw material in the manufacture of bichromate of potash, alum, and other chemicals.

Not one of the Government witnesses could prove why sulphate of potash should be protected, why the farmer should be deprived of it, or why the chemical manufacturer who desired to use it as raw material should be compelled to pay an extra price for it on account of a 20% duty. It was proved at the trial that every pound of this importation was used for fertilizer purposes, that there are many kinds of sulphate of potash manufactured from various sources; that the article in question is a crude or raw material, and not crystal line, and that it was impossible to use it for chemical or medicinal purposes without being purified and refined, which is a very expensive process. Evidence to this effect was given by Drs. Williams and Miller, of Philadelphia, Mr. C. M. Stillwell, of Stillwell and Gladding, New York, Mr. Albert U. Andrus, of Lazell, Dalley and Co. and Mr. Horace M. Olmstead, of E. Merck, and after a very able charge by Judge McKenna the jury brought in a verdict for the importers.

THE PAPER TRADE OF PORTUGAL.

Judging from recent reports, the paper trade of Portugal is not present in a particularly flourishing condition. The consumption of paper in the country, is, it is true, considerable, but the greater part of this is imported, the Portuguese paper mills being few in number and mostly unimportant. Importation from other countries is encouraged by low tariff duties, which vary from 15 to 100 reis per kilo,* the higher rate being imposed on writing papers, scarcely any being produced in Portugal itself; the lowest rate applies to wrappings and printings, while cardboards pay about 7½ reis per kilo. The imported paper comes principally from Germany, Belgium, and France, England being a fourth. A few years ago the annual arrivals of paper were valued at about 450,000 pesetas (about a third being cardboards, strawboards, &c.), and this total has since been largely exceeded, printings coming over in larger quantities every year. The principal importers in Lisbon are Messrs. Rodrigues and Rodrigues, Machado and Co., Virw Macieva and filhos, and Bonaventura da Costa Marques; besides these there are several smaller firms engaged in the trade. As regards the materials for home production, most of the caustic soda comes from England, the colours from Germany, alum from France, and starch and farina from Belgium; esparto is also used to some extent. Payments are generally made by three months' bills discounted at banks in the usual way.—*Paper Trade Review*.

* 1,000 reis (milreis) = 4/5½ English. 1 kilogramme nearly 2½ lbs. English.
1 peseta = about 8d. English.

ALLEGED FRAUDS ON LISTER AND CO., AT BRADFORD.

day, at the Borough Court, Bradford, Francis Stubbs, (44), Heaton, and Henry Varley, (32), drysalter, East-street, ordered to answer the charge of having conspired to cheat Lister and Co., Limited, Manningham Mills, of various dye. The magistrates on the bench were Mr. Skidmore, Ald. Smith Feather (Mayor), Ald. John Hill, Ald. Priestman, Ald. Thomas Hill, Mr. W. Oddy, Mr. T. A. R. Kell, Mr. Abraham Mitchell, and Mr. H. Waud. as crowded.

gh (instructed by Mr. A. Neill) appeared for the prosecution; w (instructed by Mr. J. Freeman) represented Stubbs; and Messrs. Ford and Warren, Leeds) defended Varley.

shaw complained of the inadequacy of the particulars of the offence as framed by the prosecution, contending that they did not contain sufficient information required to enable counsel to pick out the line of defence to prepare for cross-examination.

Varley took a similar objection, remarking that the information framed by the prosecution was so meagre as to lead to the conclusion that the defence were being misled either intentionally or orally.

gh replied that if his friends made a grievance of this matter he was willing to have a further adjournment.

For the defence intimated that they did not desire a further adjournment.

In discussing the point further, the Stipendiary ruled that the objection was not applicable to a preliminary investigation, though it would be fair on an indictment. He, however, acquiesced in a suggestion of Mr. Warren to allow the cross-examination of witnesses to be deferred, if counsel thought it desirable. It was then proceeded with, all the witnesses, on the application of Mr. Warren, being requested to leave the court.

gh, in stating the case for the prosecution, said the prisoners conspired with conspiracy, and also with obtaining money by false means from Lister and Co., Limited. Stubbs had been employed by the prosecution company under an agreement made the 3rd of July, 1889, as their foreman dyer. The company in the course of business carried on extensive dyeing operations at their mills, and the salary Stubbs received as foreman was £550. per year, of which was part of his duties, as provided by the agreement, to diligently discharge his duties to the best of his skill.

Stubbs had also to carry out to the best of his skill such orders as the company might from time to time devise. Stubbs was fully trusted by his employers, and they had confidence in his honesty and integrity, and in the course of his duties Stubbs was to give orders for such dye materials as should be required by the company. The custom was that from time to time a clerk would be sent to order goods from various people, but chiefly from Mr. Richard Varley, drysalter, of Leeds, in whose employment the prisoner was.

According to the custom adopted, the quantities were written to the clerk by Stubbs, and he would write out the orders, no price being inserted. The prices were left entirely to the discretion of Stubbs, and he fixed them in accordance with the market from time to time by Varley, and which had been agreed upon in these invoices were checked to see that the goods which were ordered corresponded with the quantities contained in them, and as so, then the invoices were passed. Of course the company employed Stubbs assumed that he had to the best of his skill that the goods which were delivered were of the quality, and that the prices he had arranged for were fair prices. His judgment and integrity were relied upon for the fact, absolute confidence was placed in him. If he was not to be trusted, he had every opportunity to defraud the company by agreeing to prices which were not fair prices, and by the person who supplied the goods to obtain a larger profit, practically robbing the purchaser. He would be able to furnish that from time to time the prisoner Varley came over Manningham Mills apparently for the purpose of arranging prices. He did not know whether the prisoner Varley was a partner of that name or not, but he was authorised to draw cheques and agreements with respect to the supply of goods on behalf of the company and had power to make contracts for the sale of articles.

which the prosecution alleged against the prisoners was that it was agreed between the two men that sums in excess of the market prices should be charged for goods, and that the plunder obtained by the firm of Richard Varley from Lister and Co. was divided in certain proportions agreed upon between Richard and the prisoner Stubbs. He would be able to show with reference to the whole of the goods that were supplied by Varley to the company were made, and that a share of the profit was paid by the company to the prisoner Stubbs. There was only one exception made

in the transaction, and that was in the price charged for fullers' earth. The prosecution had selected five of the principal articles out of the whole of those supplied by Varley to Lister and Co., and he proposed to take those five articles and show the style in which the business of the firm was conducted by the prisoners. The prosecution had confined their action to the past twelve months, because from that time the business was incorporated in a limited liability company, and it would not be possible to go back any further without preferring another indictment. He might say, however, that the system had gone on for years, the only difference being that with increasing confidence in their system as time went on the prisoners increased the amount they put into their pockets. An article called sumac was one of those supplied to Lister and Co. The market price of that never exceeded 13s. 3d. per cwt., but Lister and Co. had the privilege of paying Mr. Varley the sum of 15s. per cwt., the difference of 1s. 9d. being divided between the prisoners, Stubbs receiving 6d. per cwt. and Varley the remaining 1s. 3d., those sums being over and above what Lister and Co. should have paid if they had only paid the fair market price. There was a total sum on that article alone of £105 17s. 11d., which had been paid in excess owing to the system pursued by the prisoners, and Stubbs' share of it was £30. 4s. 9d., and the balance of £74. 13s. 2d. was retained by Varley. There was another article called cutch supplied, the regular market price of which was 27s. 6d. per cwt.; but in one instance, and in one instance alone, namely, to a firm called Messrs. Young and Co., had Mr. Varley charged 31s. per cwt. Although the whole of the other customers of the firm had only paid 27s. 6d. per cwt., he would accept the highest figure of 31s. per cwt. as the market price. That charged Lister and Co. was 37s. per cwt., being 9s. 6d. more than was charged other people, and 6s. a cwt. more than was paid by Young and Co. Stubbs' allowance of that excess price was 1s. a cwt. There was a total amount of £84. 15s. paid in excess on that item, and of that Stubbs received £14. 2s. 6d., and Varley £70. 12s. 6d. The highest price paid for fustic in the whole of Yorkshire was 6s. 6d. per cwt., and the price charged to Lister was 9s. 6d., Stubbs receiving 3d. per cwt. and Varley 2s. 9d. The total excess paid was £98. 16s. 3d., Stubbs receiving £8. 4s. 8d., Varley £90. 11s. 7d. There was a dye called fast red. He would be able to prove that Varley purchased that at 3s. per lb., and allowing a fair profit of 9d. per lb., 3s. 9d. would be a fair price to pay. The price charged Messrs. Lister was 7s. 9d. per lb., and of the excess of 4s. Stubbs received 1s. 6d. per lb. and Varley 2s. 6d. £636 on this item alone was paid in excess, Stubbs receiving £238. 10s., and Varley £397. 10s. Encouraged, as it seems, by these prices, the prisoners went further. There was a dye called "Blue 00 x," manufactured in Germany by a firm who had an agent in Bradford named Kilner. Varley had the privilege of supplying this article to Lister and Co., and it could be supplied at from 5s. 6d. to 5s. 9d. per lb. It was supplied in tins on which there was a certain mark in ink, which would be rubbed off at Varley's, and then the material was forwarded to Lister and Co. Taking as the top market price 6s. 6d. per lb., it would be shown that the price charged to Lister and Co. was 18s. 6d. per lb. The excess paid on this item was £1,038. The share paid to Stubbs was £346, and to Varley £692. The total amounts thus received in excess during the 12 months was £1,961, and of that Stubbs received £637. 1s. 11d., Varley the balance of the plunder. After Mr. Waugh had proceeded to explain how the transactions had been carried on by referring to books that had been seized at Varley's place of business,

Abijah Taylor, chemist and sample dyer in the velvet department at Manningham Mills, said he wrote out orders for drugs required according to instructions given by Stubbs, who was foreman of the department. Stubbs also fixed upon the drysalter to whom the order was to be given. He had told him to send orders for certain goods to Mr. Richard Varley, Leeds, and the invoices now produced relating to such goods had been initialled by him and F. Hull. The initialling meant that the weights and prices were correct. Harry Varley was in the habit of calling at Manningham Mills once or twice a week to see Stubbs, who would then ask him (witness) if anything was required. After making out an order he handed it to Stubbs. At the latter's request he regularly prepared a report as to the quantity of drugs and dye-ware received each week from every firm of drysalters. In reply to questions from the bench, witness added that the initialling of the invoices by himself and F. Hull meant that the weights and prices were correct. He got the prices from a book which was formerly in the weaving office.

It now transpired that the book witness was quoting from was only a copy, and his examination was adjourned for the production of the original book.

Benjamin Thomas Gibbins, a director of Lister and Co., and a manager of the velvet department at Manningham Mills, gave evidence that Stubbs was foreman dyer in the same department. His duties were to see to the dyeing of goods and buy all material that was necessary. It was also the duty of Stubbs to fix the prices at which the goods were to be bought.

Abijah Taylor recalled, produced the original book, which he said he had received five years since from another person in the department; but he was unable to say in whose handwriting the entries were made. He had at various times altered the prices in accordance with those of later invoices.

In cross-examination by Mr. Kershaw, he said that the drysalters who called did not enter the dyeing department but waited at the lodge. From 1879 till 1884 the orders for dyewares were given by Freeman Hull; and after it became Stubbs duty to give the orders he (witness) was told to check the invoice prices with the entries for similar goods in a book. After Stubbs gave this direction he accordingly put down in a book the price of "fast red" when it fell from 8s. 9d. to 8s. In the same way the figures were afterwards altered from 8s. to 7s. 9d. The price of blue oox was originally entered at 24s. 6d. per lb., but it was subsequently reduced at various times to 23s., 21s., and 20s. 6d. The latter alteration was made in the time of Stubbs giving the orders, and subsequently it was altered to 18s. 6d. Pure blue, which was considered nearly equal to oox, had been obtained from Messrs. Staley and Co., and the price put down for pure blue xx was 27s. per lb. Since then the price had been reduced, and it now stood at 21s., the alteration being made by order of Stubbs. To retain uniformity in shades it was important that the wares should be obtained from the same drysalter. Cutch was an article which varied in quality, and Stubbs had gone to several drysalters for it, the major portion of the quantity used being obtained from firms other than Varley's. Its price from all drysalters was 37s. per cwt. Fustic fluctuated much in value. In 1885 the price put down for it was 9s. 6d. per cwt. It was reduced to 9s., but the last entry for it was again 9s. 6d. It was a wood dye, used to produce a fine yellow, and for the purposes of Lister and Co. the best quality was required. Sumac was supplied sometimes in the leaf and sometimes ground. It came from Sicily, and was sold under different brands, which varied in quality.

At this point the Court adjourned till Monday. On reopening, Mr. Warren asked for an order to be allowed to inspect the stock-book of dyewares in the velvet department, and the books relative to purchases from other drysalters than Varley's, as he wanted to ascertain whether or not such persons had charged the same price, or less or more, than those paid to Varley's.

Mr. Waugh objected to the application, and said that if the defence would adopt the ordinary course by serving a notice to produce, the matter could be considered. But there were so many books that he must insist upon certain books being specified, otherwise they might have to bring a waggon-load.

The Stipendiary (Mr. Skidmore) said if the prosecution had nothing to fear from the inspection of the books, he did not see why they should object. Of course, if they stood upon their technical right that notice had not been served, there was nothing further to be said.

Mr. Warren intimated that he would serve a notice to produce.

Mr. Kershaw complained that the prosecution objected to the defence copying any portion except two pages of a book which was produced by the witness Abijah Taylor on Saturday.

Mr. Waugh said his answer was that the book was produced and particular pages referred to as being those by which the prices in Richard Varley's list were checked. The rest of the book was not put in as evidence, and the defence would have objected if he had attempted to do it.

Mr. Kershaw replied that the book was put in as a list of prices, which might have been a long sheet, and not a book; and he could not understand the difficulties which were thrown in the way of the defence.

The Stipendiary said he thought the defence were entitled to it.

The book was accordingly handed to Mr. Kershaw.

Abijah Taylor, chemist and sample dyer in the velvet department at Manningham Mills, was again called and cross-examined by Mr. Kershaw. He said the business had greatly extended since 1879, and to a great extent the dying of particular shades had caused the success of the plush trade. The shades were due to the experiments conducted by Stubbs. Probably it would be dangerous to Lister and Co.'s trade to change the dyer. He knew that Stubbs had given notice to leave the service of Lister and Co., it being the common talk at the mill. He believed that at Saltaire Mills the manufacture and dyeing of plushes were carried on. He did not know anybody who had the same reputation as Stubbs for dyeing plushes. Supposing Stubbs went to Saltaire Mills in the same capacity, and obtained dyewares from the same drysalters, there would be a danger of some of Lister and Co.'s business being transferred. As to the ordering of goods, if Stubbs was away when the drysalter called, the order would be given by himself, if any were required. He had frequently given orders under such circumstances. In certain drugs Stubbs had told him to distribute the orders as equally as possible, among different drysalters; for instance, he had been told to distribute the orders for aniline dyes between Varley's and Staley's. Blue entered into about two-thirds of the different shades of plush, which were 150 in number. He had known cases in which Stubbs asked him the price which was being paid for certain dyewares,

and to answer him it was necessary to consult the book which I (witness) kept. Stubbs knew that this book was kept as a check on the prices. Goods for other departments were also obtained from Varley's and the invoices for such goods would be initialled and checked byson one else. He had heard Stubbs complain of the quality of the yarn which he had to dye. During the time that F. Hull made out the orders for goods some experiments were made with aniline dyes. The result was shown to Stubbs, who was allowed to exercise his discretion in the matter.

Cross-examined by Mr. Warren, witness said a book was kept in which were entered the names of persons from whom goods were purchased. There was another book called the velvet dyer's purchasing book, in which the prices of goods received were entered.

Mr. Warren asked for the production of these books, or for an opportunity of inspecting them.

The Stipendiary said he thought the defence were entitled to see the books indicated.

Mr. Waugh replied that he would confer with his advisers in reference to the most convenient time for the inspection of the books.

Benjamin T. Gibbins, a director of Lister and Co. Limited, an manager of the velvet department at Manningham Mills, whose evidence was given on Saturday, was recalled for the purpose of cross-examination. Questioned by Mr. Kershaw, he admitted that till the engagement of Stubbs the firm had not been able to obtain a satisfactory dyer for plush. The success of the firm in the plush trade had been partially due to the shades of the dyeing, and to the fact that the shades were fast to light. Of course, there was not really such a thin as "fast to light," although the tickets on the pieces stated that the were "fast colours." The firm did not guarantee them as fast colours the term was merely a trade one, meaning that the colours were durable. He had no doubt that he had told Stubbs repeatedly that it was important to have the goods dyed with fast colours. Between 187 and 1884 Stubbs was allowed to do as he liked with regard to seeing the drysalters and selecting the dyewares required. He remembered that on one occasion he heard that Stubbs was going to leave. That was in 1884, and he was told that Stubbs had arranged to go to the firm at Saltaire. He considered it important that the services of Stubbs should be retained, and arrangements were made for him to remain. It came to his knowledge that Stubbs at that time complained that he had not been allowed to see the drysalters or to order goods; but he did not remember that Stubbs gave that as a reason for desiring to leave. He did not remember Stubbs saying that he had not been properly treated by Mr. Hull, who had the right to purchase the drugs. He said he had made an absolute contract with Messrs. Salt, and showed the agreement to himself and Mr. Reixach, the general manager. It was arranged that he should continue in the service of Messrs. Lister and Co., by giving him an indemnity against any proceedings by Messrs. Salt. He could not recollect that Stubbs then said that there had been complaints about the colours not being fast, he wished to see the drysalters. So far as he knew, Stubbs had always seen them at the lodge, none of them being allowed in the works. Mr. Hull acted as clerk to Stubbs, and also as clerk in the weaving department.

In reply to Mr. Warren, witness said he could not recollect whether Abijah Taylor was in the department before 1884, nor had he any recollection of Mr. Reixach having stated to him that Stubbs was continually complaining that he was not allowed to order his dyewares. As salesman of the department, he (witness) had never sold goods at three times the value of their cost. He did not think it would be good policy to buy in the cheapest market and sell at the highest price; he should do his best, but on the principle of doing unto others as he expected to be done unto.

Freeman Hull, clerk in the velvet-weaving department, said his initialling of the invoices had nothing to do with the prices, but merely referred to the distribution of the items in the respective departments. Formerly he gave the orders to the drysalters when told by Stubbs what was required, his instructions by the latter being to the effect that he was to see that the prices were as nearly as possible to those entered in the book as the price previously given. The previous price had probably been fixed in the same way. He had not fixed any of the original prices without having the sanction of Stubbs. In cross-examination, witness said this arrangement had existed for several years prior to 1885, when it ceased. He believed the book of original prices was in the hand-writing of a clerk named Woodcock, employed in the weaving department; but he could not say that he gave Woodcock instructions to enter the prices. He had seen Stubbs at the lodge with Varley before 1885, but he could not say how often. He had never heard that Varley was told that he must not supply red or blue dyewares to any other firm than Lister's. He could not recollect giving Varley any samples to match, or telling him the prices paid to other people.

Edward Woodhead, clerk to Messrs. Brown and Co., 6, Chape street, Liverpool, was called to prove sales of cutch to Mr. Richard Varley, Leeds, in August last; but as he only produced a press copy

, which was not in his own handwriting, objected to his evidence, on the ground that he was not could answer the questions which would have to be put nation. liary upheld the objection. iteman, clerk with Messrs. John Fletcher, jun., and Co., rpool, proved that during January, 1889, his firm sold ard Varley, of Leeds; and in cross-examination he stated of cutch varied from 15s. to 34s. per cwt. During last a scarce, and the price mentioned in the invoice of sale to y was 28s. per cwt. His firm did not pay the carriage. ns of the firm of Varley with his firm had always been ward character. hen adjourned till Tuesday.

ME MORDANTS IN WOOL DYEING.

as a mordant for polygenetic colours in wool dyeing is employed in the form of potassium or sodium bichromate. strong oxidising agent, may under certain circumstances ool or the colouring matter employed, and more or less Hence the desirability of a chromium salt not possessing

In view of this, those chromium salts in which the rms the base, such as chromium sulphate, chrome alum, rally turned to. The last-named salt has long been pro- efficient substitute for potassium bichromate. As a by- e manufacture of alizarine, it is comparatively cheap, and ve expected that it would frequently be employed in prac- s, no doubt, would be the case if it had been found superior te of potash. It is well known that chromium sulphate, , are not satisfactorily fixed on cotton by the methods which h the corresponding aluminium salts, and it would not be chromium and aluminium salts showed similar differences s mordants for wool. From experiments made by Gardner at chrome alum may be applied in the same way as common in addition of cream of tartar, but whereas with one mole- non alum four molecules of cream of tartar are sufficient, lecule of chrome alum it is necessary to use from twelve to lecules of cream of tartar. The great expense of this large eam of tartar is probably the reason why chrome alum is lly employed.

e of chromium ($\text{CrF}_3 \cdot 4\text{H}_2\text{O}$) has recently been put upon the ler the name of "fluorchrome." This substance, like n and oxalic acid, is a non-oxidising mordant, and also een (Cr_2O_3) mordanted wool, but attempts to obtain it right full shades as with the use of potassium bichromate acid were not successful. It appears also to give some- n shades, but possibly these defects may be overcome s. The defects noticed are possibly due to the hydrofluoric d in the mordanting operation. "Fluorchrome" is con- ore expensive than chrome alum and oxalic acid.

d with other metals chromium appears to be the most eful as a mordant for wool, since it gives both red, yellow, ours with different colouring matters, so that, by using a colouring matters, a very large variety of compound shades ained. Of the various chromium salts which have been chromates are the best for general use, being cheap, easily l apparently not materially affecting the fibre, although the ; much questioned. The shades produced by chromium e a rule dark, brilliant, and very fast to light and alkalis. lcury.

ATED OIL GAS.—Dr. Thorne, of the Brin's Oxygen Com- cently carried out a series of experiments with the view of dvantages of the Tatham patent for the manufacture of an ry high illuminating power. It will be in the recollection rs that Mr. Valon has shown, at Ramsgate, that oxygen with advantage for the purification of coal gas, and that it in his process the addition of oxygen to the gas caused in the illuminating power. The same is now found to be en oxygen is added to oil gas, and it has been shewn that as per cent. of oxygen can be added to the oil gas without any ng an explosive mixture. The process at present used at orks at Westminster consists in first heating American o a moderate temperature in an iron retort, and then adding and vapours produced about 20 per cent. of oxygen, which subsequent condensation of the vapours and at the same usly increases the illuminating power. The necessary very simple description, and, as far as one can judge from nts which have been carried out, there seems every ground ; that the process is one which will be found to work well cale and be capable of producing an illuminating gas of high a comparatively cheap rate.—*In Industries.*

PERMANENT CHEMICAL EXHIBITION.

- JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds.
- ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Gas Plant generally.
- BLACKMAN VENTILATING CO., LONDON.—Fans, Air Propellers, Ventilating Machinery.
- G. G. BLACKWELL AND CO, LIVERPOOL.—Manganese Ores, Bauxite, French Chalk. Importers of minerals of every description.
- BRACHER AND CO., WINCANTON.—Automatic Stills, and Patent Mixing Machinery for Dry Paints, Powders, &c.
- BRUNNER, MOND AND CO, NORTHWICH.—Bicarbonate of Soda, Soda Ash, Soda Crystals, Muriate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.
- BUCKLEY BRICK AND TILE CO, BUCKLEY.—Fireclay ware of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.
- CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Driers and Steam Traps (McDougall's Patent).
- W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.
- CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Salt, Benzole, Toluole, Xylol, and Nitro-compounds of all kinds.
- J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps and Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.
- R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Plant—Blowing Engines, Filter Presses, Sludge Pumps, &c.
- DAVIS BROS., MANCHESTER.—Samples of Products from various chemical products—Coal Distilling, Evaporation of Paper-lyes, Treatment of waste liquors from mills, &c.
- R. AND J. DEMPSTER, MANCHESTER.—Photographs of Gas Plants, Holders, Condensers, Purifiers, &c.
- DOULTON AND CO., LAMBETH.—Specimens of Chemical Stoneware, Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.
- E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Ozone Bleached Esparto Pulp, Ozonised Oil, Ozone Ammoniated Lime, &c.
- GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.
- GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Sizing Materials, India-rubber Chemicals.
- JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters.
- JOSEPH KERSHAW AND CO., HOLLINWOOD.—Soaps, Greases, and Varnishes of various kinds to suit all requirements.
- C. R. LINDSEY AND CO., CLAYTON.—Pyroligneous Products. Acetate of Lead, Sulphate of Copper, &c.
- CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Carbolic Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants, &c.
- MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours, Samples of Dyed Goods and Miscellaneous Chemicals, both organic and inorganic.
- MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhausters, Silent Boiling Jets, Air Compressors, and Acid Lifters.
- E. D. MILNES AND BROTHER, BURY.—Dyewoods and Dyewood Extracts. Also samples of dyed fabrics.
- MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Makers of all kinds of heating appliances.
- NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid, Soda Ash, Recovered Sulphur, etc.
- ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent valves.
- J. ROYLE, MANCHESTER.—Steam Reducing Valves.
- A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitute, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, and Disinfecting Fluids.
- WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pumping Machinery. Speciality, their "Duplex" Pump.
- JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-water Heater. Makers also of Multiple Effect Stills, and Water-softening Apparatus.

FLAMES.*

I WILL begin my remarks with a paradox. Flames are of no importance, yet the subject is a very important one indeed, and has not received the amount of attention which it deserves, either from a commercial or a scientific point of view. Flame is really nothing but a sign of an incomplete or transition state of chemical combination. Its presence during combustion is not always necessary, and I think I am within the actual facts when I say that its presence, under practical conditions in commercial use, indicates always a loss of work.

The appearance of flame is misleading, and the greater the flame the smaller the work done, other things being equal. I have been asked by a well-known engineer if I could explain why certain boilers gave such an exceedingly small duty for the fuel consumed when the flues were, as he said, "filled from end to end with magnificent flame;" the fact was that his so-called magnificent flame was a delusion, hollow and cold inside, and not coming into contact with his boiler at all. When the same fuel was burnt with a very small flame, hardly visible over the bridge, the duty increased some thirty per cent.

I will now give you some practical demonstrations of the various characters of flames and their delusive appearances. A cotton handkerchief, as you no doubt are aware, will burn readily to ashes, and I will prove this to you by burning one. I have here another, precisely the same, which I will saturate with proof spirits of wine, and, as you see, the flame, although apparently a fierce one, is not hot enough to ignite the handkerchief, which comes out of the fiery test without a singe or mark. The fact is that the flame is not only comparatively a cold and wet one, but it is also hollow, and does not come in contact with the handkerchief at all, the space between the handkerchief and the flame being filled with cold vapour, which only burns when it comes in contact with the surrounding air. You may perhaps smile at the mention of a "wet" flame, but the term is perfectly correct. All flames, in which hydrogen is burnt along with oxygen, contain water, and, in addition to this, water formed by the process of combustion. The proof spirit contains also a large quantity. A great proportion of the energy of combustion is absorbed in converting this water into steam, the temperature being reduced to the lowest point at which flame can exist; in fact, as the spirit is consumed more rapidly than it has power to dissipate the water, the temperature of the flame gradually lowers until it actually becomes too cold to maintain its existence. To make the internal space in a flame visible to you it is necessary to experiment in a different way. I now take a burner eight inches in diameter, supplied with a mixture of coal gas and air, the air being in a quantity sufficient to increase the bulk of the flame, but not enough to enable the gas to burn, except on the outer surface where the mixture comes in contact with the surrounding air, with which it combines. This great flame is of very little use for any purpose, and I will now proceed to prove how great a delusion it is by placing a ball of paper inside it, then some loose gunpowder on an open paper, and again a ball of gun-cotton, all of which remain untouched. The outer film of flame is hot enough to burn my hand if left in it; but if the body of my hand is protected I can, as you see, put my naked fingers inside the flame without discomfort, and pick the paper of gun cotton out of the centre of the flame.

I will prove the presence of unburnt gas in the centre of the flame by leading some of it out with a tube and igniting it in a separate flame; and I will again prove the presence of unburnt gas in the centre of this second flame, by leading some of it again and producing a third separate flame from the gas abstracted from the centre of the original flame.

By an alteration of the burner, admitting sufficient air with the gas to form an explosive mixture, which will burn without assistance from the external air, the flame instantly becomes solid, much smaller, less visible, and at once explodes the gunpowder. To reduce the flame to a still smaller size, a different form of burner is necessary, with a supply of air under pressure, and you now see the same quantity of gas and air burning, but the space taken up by the combustion, instead of being as at first eight inches wide, and 18 inches high, is less than one hundredth part the size; and instead of being able to put my bare hand in, it will fuse wrought iron instantly. It is well known that the available duty of any source of heat is, other things being equal, in direct proportion to the difference of temperature between this source and the object to be heated; and, therefore, we shall get a much larger amount of work from our small high temperature flame than from the large and colder one. I will now dispense with flame altogether, and show you the same quantity of gas and air burning as before, but in the most perfect form, the combination taken place without any flame and on the surface of the substance to be heated. To show this so that all can see, the mixture of gas and air is directed on a large ball of iron wire, flame being used at first to heat

the wire to the necessary temperature to continue the combustion. By stopping the gas supply for an instant the flame is extinguished, and the combustion is now continued without any flame but with an enormous increase in the heat obtained. This invisible flameless combustion is only possible under certain conditions, and the essential point is that the combustible mixture shall come in absolute contact with a substance at a high temperature which is capable of absorbing the heat as it is generated. I will now heat this small furnace to a temperature sufficient to cause combustion without flame, and will then remove the side, showing you the interior of the furnace with the crucible being kept at a white heat by blowing a cold mixture of gas and air into it. In the absence of a solid substance at a high temperature, it is, so far as is known, impossible to cause combustion without flame; and when a flame is used it is also impossible to make the flame touch a cold surface.

Many of you will imagine that if a solid body is surrounded by flame the flame touches it; this is altogether a mistake. There is a space between the two which it is impossible to pass, a cold and flameless zone which surrounds the cold surface, which is quite impassable to flame under any conditions, and which most seriously obstructs the work of heating. To enable you to see that this impassable cold zone exists beyond any doubt, I have here a copper vessel containing water and on the side of this vessel I have pasted a thin paper label. On this I will direct the powerful flame, which you have seen will fuse wrought iron instantly, and the paper remains untouched, without trace of singeing. The full force of the flame, urged by a heavy blast of air, may be directed on this paper for any length of time without the slightest effect, so long as the vessel contains any water. You will, no doubt, imagine that the heat is absorbed so quickly that the paper has not time to get hot, but it is very easy to prove that this is not the case by heating a wire in the same flame and touching the paper with it causing instant charring. The cause of this extraordinary result has never yet been fully explained, but I believe it to be that all substances have an adherent film of air which resists the passage of any flame, but which is, of course, instantly removed by the application of any solid substance. This theory has one weak point, that the cold zone is impassable also to radiant heat; and in the face of this fact I must say that a really satisfactory explanation is yet to be found which will agree with the present accepted theories of heat. The action of flame on heated matter on moist surfaces is much more easily explained. It is known that a moist hand or stick can be passed through molten iron without burning, owing to the film or steam evolved, which prevents contact with the metal. The same reason accounts for the fact that I can burn gun cotton on my hand without feeling any heat, the moisture present absorbing the heat as fast as it is evolved. In the case of the paper label on the metal vessel there is no moisture, the label having been carefully dried to prevent the sudden formation of steam lifting it away from the metal surface; and I think that the peculiar resistance to flame contact with a cold surface requires some further explanation than the present theories can account for. In connection with the subject of flames, I may refer, as a curiosity, to the enormous volume of sound of different tones which is produced by placing various sizes of chimneys on a gauze burner consuming a mixture of gas and air. The sound is as powerful, but certainly not so pleasing, as that of a fog horn. In the combustion of iron, magnesium, and other substances of which the product is a solid, and not a vapour of gas, flame proper never exists, although in the combustion of magnesium and zinc it is apparently present. The brilliant incandescence of the particles of oxide thrown off at a very high temperature causes a deceptive appearance.

(To be continued.)

SULPHITE PULP IN AMERICA.

THE following abstract is from a letter on the above subject by Mr. Waldemar Thilmann, Kaukauna, Wisconsin, U.S.A., on March 13th, to the *Papier Zeitung*, No. 35, 1st May, 1890.

At the Thilmann Pulp and Paper Works, the Mitcherlich Sulphite process is at work. The first mill using this process was started at Alpena, Michigan, in November, 1886, with a daily output of 20 tons of 2,000 lb per ton.

It interested him much to find out how the different kinds of wood would behave in the sulphite process, and he therefore allowed a boiler full of each of the following different woods to be digested, viz.: Beech (*Fagus Sylvatica L.*), birch (*Betula Alba*), maple (*Acer Pseudoplatanus* and *Acer Platanoides L.*), American larch (*Pinus Larix L.*), aspen (*Populus tremula L.*), black poplar (*Populus Nigra L.*), red pine (*Pinus Picea*), spruce or white pine (*Pinus Abies*), yellow pine (*Pinus Sylvestris*).

The wood was freshly felled, and had a diameter varying from five to eight inches. It was cut into discs of $1\frac{1}{4}$ inches thick, and then digested whole with a solution of $5\frac{1}{2}^{\circ}$ Baumé by the Mitcherlich method.

* Corn Exchange, Oxford, April 25th, 1890. Lecture delivered by Thomas Fletcher, F.C.S.

woods with the exception of the *Pinus Sylvestris* (which is in the centre), were well-boiled and completely soft. Birch, and maple yielded snow-white sulphite pulp, whose fibre was considerably shorter than that from the red or *Pinus Picea* and *Pinus abies*), and consequently they did not strong a paper.

At some boilers full of larchwood ("Tamrack") were the pulp run off on a cylinder machine in the same way as the paper mills. The fibre appeared good and strong, but it was mottled, i.e., it varied from dark brown to citron

at the seven mills in America, working the Mitcherlich process daily about 70 tons pulp, and use exclusively spruce or fir wood (*Pinus Abies*).

Four mills, situated in the Fox River Valley, with eight each 14 feet diameter and 42 feet long, produce daily 20 tons; whilst another mill at Madison, Maine, has 20 digesters of the same size, equal to a daily output of 20 tons pulp.

Sulphite pulp prepared by the Mitcherlich process is clean if the wood is properly sorted. There is apparently a difference in the quality of the fibre obtained from American spruce by the sulphite process compared with imported sulphite pulps, even those made by the Mitcherlich system in Europe. Tests of raw American-made sulphite newspaper made from it, in a paper mill belonging to Mr. J. H. Brother, revealed the fact that from 10 to 15% more sulphite had to be used to obtain the same results as regards

quality. Sulphite imported to America are frequently mixed, so that the quality is not always provided with the same make. How the importer only knows. This he keeps secret, and by untrue assertions regarding it. The papermaker who has made good newspaper from 20% sulphite and 80% mechanical pulp, suddenly finds that his paper is much weaker, frequently many complaints pour in upon him. He then examines his pulps, and finds among them the most diverse

quality of white pulp made in America and manufactured into newspaper for this purpose in the unbleached state.

PRIZE COMPETITION.

More than twelve months ago, one of our friends suggested that it might be well to invite articles for publication, on some subject of special interest to our readers. Giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and to give a subject in which he was personally interested. At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of time we have come to think that the elaboration of such a subject would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday of the prize winner. We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

Best method of pumping or otherwise lifting or forcing aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

Best method of separating or determining the relative amounts of tin and antimony when present together in compounds.

On this subject, the following prizes are offered:—

First prize of five pounds, one second prize of one pound, and three additional prizes to those next in order of merit, each of a free copy of the *Chemical Trade Journal* for six months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, in Subject II, and on or before May 31st, in Subject I. The results will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the conclusions of any competitor.

Essays may be written in English, German, French, Spanish

THE VALUE OF CORN AS A FUEL, AND AS A FERTILISER, AND BOTH.

Under the above somewhat sensational heading, the *American Economist* draws attention to the fact that a superabundant production of corn has led to the necessity for finding a new outlet. The outlet proposed may at first sight startle our readers. "While," the writer goes on to say, "this condition is very distressing it is not without its palliating circumstances, which are:—

1st, its value for fuel, the same being tested by the cost of coal to farmers, and 2nd, the value of its ashes as a fertiliser after burning, as tested by an analysis of the same.

The first point is approximately fixed by a communication from an esteemed friend, who is a Kansas farmer, thus:—

Coal at the mines in Franklin and Osage Counties, 80 lbs. to the bushel, sells at 8 to 10 cents per bushel, or 25 bushels to the ton, equal to \$2 to \$2.50 per ton.

With corn at the same price per bushel which is just now unfortunately a not uncommon rate that amounts practically to an exchange of a bushel of corn for a bushel of coal.

True, the weight of a bushel of coal (70 lbs.) is a quarter more than that of a bushel of corn (56 lbs.), but that is probably fully made up by the more perfect combustion of corn, which leaves no residuum but the ashes, while coal leaves a great quantity of almost useless residuum.

True, the farmer in this instance has to haul the coal from the mines, but that is only equivalent on the average to carting corn to the railroads.

In Franklin County, 70 miles from Kansas City, corn has ruled at 15 cents per bushel; at 100 miles west from this county 10 cents has been the price.

In the middle and western counties of Kansas there is no coal and very little timber; consequently coal is imported from the East and from Colorado. The cost, delivered, is 16 to 18 cents per bushel, equal to \$4 to \$4.50 per ton.

The price of coal in McPherson County, one of the central counties of our State, is \$5 per ton.

The latter showing is not so good as the former. If he gets no more for his corn than in the first quotation he practically swaps off two (2) bushels of corn for one (1) bushel of coal.

A bad showing enough, certainly, but it has the mitigating and consoling feature that he largely preserves the plant food, used by the corn in its growth, in the ashes retained after burning, which, thanks to the labours of agricultural chemists, can be ascertained with entire accuracy.

Among such authorities Colonel George E. Fearing is conspicuous, and in his valuable book entitled "Elements of Agriculture," published by the New York Tribune Association, when Horace Greeley administered it, is a table showing the amount of such plant food in pounds for ten bushels of corn, thus:—

Potash pounds	2.78
Lime	0.12
Magnesia	1.52
Phosphoric acid	4.52
Silica (sand)	0.06

This is corroborated by another analysis of the ashes of corn, showing in every 1,000 parts of potash 261 parts; phosphorus, 449 parts.

Disregarding the value of all elements but potash and phosphoric acid, and applying the values per pound of the same at the prices fixed at the New Jersey Experimental Station, the following results appear for every ten bushels burned:—

Potash, 278 lbs. at 6 cents, 16.68, say	17 cents
Phosphoric acid, 452 lbs. at 8 cents, 36.16	36 "

Value of ashes from 10 bushels corn

53 cents

or five and three-tenths cents per bushel on all corn fed or burned on the farm, which is lost when the corn is sent away to market.

This, of course, should be noted when prices are considered, as it nearly doubles the minimum value of such corn as is used for fuel."

PREPARATION OF IODINE.—It is found that in every 100 kilograms of impure nitrate there are 50 grams of iodine, and that in the crystallisation of the nitrate the water used, called, technically, "agua vieja," holds it in solution. In order to extract it, this old water is drawn off into a separate tank and charged with sulphite of soda, forming the iodide of sodium, precipitating the iodine, which, containing more or less impurities, is refined by sublimation and condensation.

During the ten years ending December 31st, 1888, the exports of iodine amounted to 1,588,074 kilograms, with a total value of \$19,333,757, upon which the Government collected in export duties \$1,172,576.

GOLD ORES REDUCTION.

IN response to an invitation from the Gold Ores Reduction Company (Limited), a number of gentlemen attended at the company's works, Hackney Wick, a few days ago, to witness the process of gold extraction under their patents. This company has, for some time past, been treating refractory ores under methods invented by Mr. H. Hutchins, and they claim to have secured a degree of success hitherto unknown. The whole system was demonstrated at the works for the benefit of the visitors, and the inventor gave detailed explanations of the process. A large crusher was filled with lumps of rock, which it champed and then ejected in small pieces. From this crusher the ore was passed to an adjacent mill, where it was ground as fine as snuff, and then worked through the hair-meshes of an oscillating sifter; thence it was transferred to the furnace, where the powder was subjected to a thorough roasting by hot air. It is here that the special method of the patent takes effect, it being claimed that a complete oxidation of the intractable sulphurets and arsenical ores takes place, and by artificial means the gold is freed. The whole system, from the crushing to the panning, is computed at about an hour. In the condition of a fine rouge-like product the ore is passed from the furnace to the amalgamators, where the powder is ground with water until the gold has flown to its natural amalgam, where it is drawn off and is ready for retort distillation in the laboratory. Two or three hours, it is stated, are sufficient to treat a ton of minerals, and the plant at present erected on the works has a capacity to treat 100 tons a week; but it is intended to supplant this by others. The moderate cost of the process is represented as one of its chief attractions; a furnace can be erected for about £200., and adapted to any existing works, being added between the stamps and the amalgamator. A feature of the system is that flower of quicksilver is entirely obviated by the new process.

Market Reports.**METAL MARKET REPORT.**

	Last week.		This week
Iron	44/8½	....	44/5
Tin	£92 0 0	....	£92 0 0
Copper	49 0 0	....	49 13 9
Spelter	21 7 6	....	21 5 0
Lead	12 7 6	....	12 17 6
Silver	47d.	....	46d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	17 17½	....	17½ 17½
Mason & Barry	6½ 6½	....	6½ 6½
Tharsis	4½ 5½	....	4½ 5½
Cape Copper Co. ..	3½ 4	....	3½ 4
Namaqua	2½ 2½	....	2½ 2½
Copiapu	2½ 2½	....	2½ 2½
Panulcillo	1½ 1½	....	1 1½
Libiola	2½ 2½	....	2½ 2½
New Quebrada	½ ½	....	½ ¾
Tocopilla	1/- 1/6	....	1/- 1/6
Argentella	3d. 9d.	....	3d. 9d.

REPORT ON MANURE MATERIAL.

There has been during the past week a continued active retail business in both phosphatic and nitrogenous material for immediate delivery.

The manure manufacturers, too, are very busy, and as they see their stocks being rapidly reduced, they seem more inclined to consider the purchase of their next season's material.

The easier freights obtainable for Charleston phosphate rock permit of lower prices than were current a month or two ago, and it is quite likely that about 10d. per unit might now be business for land rock—perhaps also for River—in cargoes, c.i.f. to United Kingdom. We also think that some concession will have to be made for Somme and Canadian to induce any important business in these descriptions.

A large portion of the River Plate production of bone ash is reported to have changed hands recently at £5. 2s. 6d. up to £5 7s. 6d., on 70%, partly for Germany and partly for United Kingdom, indicating on the part of buyers a strong opinion as to the future.

There is nothing to report in cargoes of River Plate bones, it being now almost too late for present United Kingdom season, and the United States not so far having come forward as buyers for shipment ahead, as they have done for some years back. Common grinding bones are selling at Liverpool at £4. 3s. 9d. for rough and dirty parcels, up to £4. 15s. for good, clean, dry lots.

East Indian bone meal is selling at £5. 10s. ex quay Liverpool, and

same price required to arrive. We do not hear of any forward business.

Two hundred tons crushed Kurrachee bones arrived, Liverpool, sold at £5, ex quay, which price is asked for shipment ahead. Nitrate of soda without much change in values, but market quieter. Spot price 8s. for ordinary; 8s. 1½d. for refined. Due cargoes are worth about 8s., and for shipment ahead 8s. 4½d. to 8s. 9d. would have to be paid according to position.

Some considerable sales of home prepared dried blood have been made, and makers seem inclined to hold now for higher prices, but buyers don't, so far, follow. Ten shillings and sixpence to 11s., according to position of works, now asked.

Superphosphates are more enquired for, and 47s. 6d. up to 50s., net cash, in bulk, f.o.r., at works, now asked, but in some quarters less is being taken.

TAR AND AMMONIA PRODUCTS.

The benzol market is decidedly firmer than it was at this time last week, and 3s. 9d. may be quoted for 90's benzol, and 2s. 9d. for 50's. Solvent naphtha is hardened likewise, and prices may be regarded as 1d. dearer than in our last report. Creosote is still moving off freely, while crude carbolic and anthracene are still neglected. The pitch market is very dull, and no sales of any moment have taken place 28s. on East coast ports is about to-day's nominal value, but we cannot hear of any business whatever in the meantime.

The sulphate of ammonia market is still in a peculiar position. A fair amount of business has been passing at current rates, and in some quarters a steadier tone is reported. There is not so much eagerness on behalf of makers to realise, and provided discretion in offering parcels is now exercised no further shrinkage of value should take place. On the other hand, there are some who believe that prices will go still lower, but that we shall see a reaction for forward delivery before the end of this month. Prices to-day stand at £11. 2s. 6d. for Hull and Leith, while Beckton, as well as outside London makes, are selling for £11 6s. 3d.

MISCELLANEOUS CHEMICAL MARKET.

There has been an absence of activity in nearly all branches of the trade, and few changes of any importance in values during the past week. In the alkali trade prices all round remain steady. Caustic soda recovered slightly, and any further decline in value is not looked upon as probable. F.o.b. Liverpool quotations are for 74%, £10. per ton; 70%, £9. to £9. 5s.; 60%, £8. 5s. Soda ash still in good demand at 1½d. per deg at Liverpool for certain brands. 1½d. per deg. for caustic ash. Soda crystals £2. 17s. 6d. at makers' works in casks. Chlorate of potash 4½d. to 5d. per lb. Bleaching powder in fair request and steady at £5. per ton, on rails, and at £5. 7s. 6d. f.o.b. Recovered sulphur in all grades rather slow of sale, and prices without alteration. Sulphate of copper, prompt delivery, £25. to £26. per ton, and scarce; £23. to £24. for June, and lower quotations for forward. White powdered arsenic in good demand and firm at £13. to £13. 10s. net at usual points. Acetates of lime more freely offered; brown at £7. 15s. and in plentiful supply; grey in limited supply at £13 15s. to £14. per ton. Acetate of soda dearer on the spot. Acetic acid without change. Acetate of lead and nitrate of lead firm, and rather more inquiry. Flake litharge, £15. 15s. per ton. Potash, caustic and carbonate meeting with ready sale at current rates. Yellow prussiate of potash continues to hold a firm position at 9½d. to 9¾d. for British makes, and 9¾d. for foreign. Bichromate and chromic acid unaltered in price. Tartaric acid firm at 1s. 3d. per lb. Carbolic acid crystals have still a downward tendency, owing to the falling off in demand. Aniline salt and oil are firm in prices, and meeting with a ready sale; pure oil at 10¾d. to 11d. per lb., and pure salt at 9d. to 9½d. per lb. Ammonium salts all round are dull, and prices stationary.

THE COPPER MARKET.

Messrs. Harrington and Co.'s copper report, dated Liverpool, 15 May, states: Chili copper charters for second half of April are advised to-day as 900 tons fine. The total charters since 1st January have been 8,500 tons, against 9,900 tons for same time last year. The trade have participated pretty freely, as also in furnace material; but speculation, we think, has been interfered with by the excited and unsettled state of the silver market. The Association for yellow metal on the 17th ult., reduced its price to 5½d., but have to-day advanced same to 5¾d. per lb. It is reported that the French banker have just sold the greater portion of their American stock of ingots and slab copper, and that the quantity they now control there does not exceed 6,000 tons. The present stock of English g.m.b.'s in ware house, Liverpool and Swansea, is 6,092 tons, against 6,401 tons of

owing a decrease of 309 tons for the fortnight and 494 tons. The sales of furnace stuffs comprise—Liverpool, 130 ore, at 9s. 9d.; 126 tons Italian ore (10%) at 8s.; 200 ore (15 to 20%) at 9s.; 26 tons (35%) at 10s.; 300 tons at 10s.; 583 tons ordinary Anaconda Matte (second hands) at 10s.; 212 tons at 10s. 1d.; and 1,000 tons Argentine terms. Swansea—1,100 tons Namaqua ore (to arrive), and 765 tons at 9s. 3d.; also 1,250 tons Spanish ore and rich in sulphur at 8s. 6d. Precipitate: 400 tons Mora (re-sale) at 9s. 6d.; 60 tons Seville at 10s. 4½d.; Miguel, at 10s.; 219 tons Mason's (old syndicate stock) at 164 tons at 9s. 7½d.; 100 tons English, at 10s. 3d. per

THE TYNE CHEMICAL REPORT.

TUESDAY.

Chemical market is much steadier this week, although there is less doing. The general feeling is that prices have about reached bottom for the present. Bleaching powder keeps quiet at 2s. 6d. to 5s. per ton lower than last week. Caustic soda steady at same price as quoted a week ago. Soda crystals brisk demand and prices are unchanged. Soda ash is just easier, and sulphate of soda 1s. 6d. per ton under last week.

To-day's quotations are as follows:—Bleaching powder, 1 cask, £5. to £5. 2s. 6d. per ton; caustic soda 77%, £10. 10d. bound in 3-4 cwt. barrels, £13. per ton; soda ash, 48/52%, degree less 3½%; soda crystals, in 1 cwt. bags, net weight, 11d. per ton, in 2 cwt. bags, net weight, £2. 11s. per ton; gross weight, £2. 11s. per ton; sulphate of soda, in bulk, per ton; ground, in casks, 43s. 6d. per ton; recovered, 44s. 5s. per ton; chlorate of potash, 4¾d. per lb.; silicate of Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° per ton; hyposulphite of soda, in 1 cwt. kegs, £5. 15s. per ton; 7 cwt. casks, £5. 5s. per ton; pure white sulphate of soda, 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of soda, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; 19. 5s. per ton; sulphide of barium, £5. 10s. per ton—Tyne, or f.o.r. makers' works.

No change in the price of small coal for manufacturing. Northumberland steam quoted 8s. 6d. to 8s. 9d. per ton, and small 10s. per ton. The representatives of the Durham Miners' and Miners' Associations met together in Newcastle last week and discussed the question of a further advance of wages, but were unable to come to a decision; the meeting was therefore adjourned for another week.

Production of magnesia will shortly be recommenced in a large chemical works. The same company are preparing to use pearl hardening for paper making purposes.

Following are the exports of chemicals from the Tyne for the month of April, and the corresponding month last year:—

	April 1890.	April 1889.
	Tons.	Tons.
Potash and soda ash	1,175	1,590
Sulphate of soda	10	8
Bleaching powder	3,278	2,035
Sulphur	579	816
Soda crystals	2,701	2,482
Sulphate of soda	87	6
Other chemicals	1,657	2,877
	9,487	9,814

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Prices (both potash and soda) which were in rather better stead last week before last, have again become comparatively neglected. Potash makers are now sending out very restricted quantities. Bleaching powder also is decidedly weaker, and prices have fallen a trifle. Caustic soda is lower than it was a week ago, but has now touched bottom, and the feeling is now one of recovery, and prices are more active and quotations again rather on the mount. Potash is easier, also chlorate of potash, but nitrate of soda is at least little bit better off than it has been for the past two weeks. Actual quotations, however, not much changed. Sulphur has declined persistently, although at a very slow rate, and at present the value, prompt Leith, does not exceed 1d. It is asserted on the market here that sellers have, in the past, parted at a lower figure still; but this has not yet been satisfactorily verified, and the probability is that the above represents the extremity for the time. Paraffins unchanged. Miners are again talking of a further restriction of the

output, as a measure for forcing a rise of wages. Chief prices current are:—Soda crystals, 50s. net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 2½% Tyne; caustic soda, white, 76°, £11., 70/72°, £8. 15s., 60/62° £8., and cream, 60/62° £7. 15s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1¼d., net Tyne; saltcake, 25s. to 26s.; bleaching powder, £5. 5s. to £5. 10s. less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4¾d., less 5% any port; nitrate of soda 8s. to 8s. 3d.; sulphate of ammonia, spot, £11. 5s. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25., less 5% Liverpool; paraffin scale, hard and soft, 2¼d. per lb.; paraffin wax, 120°, semi-refined, 3¾d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¾d. to 7d. on rails, Glasgow to all Scotch buyers (fixed) (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 15s. to £8. Week's imports of sugar at Greenock were 32,793 bags.

THE LIVERPOOL COLOUR MARKET.

COLOURS are unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23.; Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

Our market has continued to rule steady this week. Manganese: Arrivals are very much easier, and prices continue firm. Magnesite: Additional arrivals have told upon the tenor of the market, and prices for raw lump are flat. Rav ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand) still continues in exceptionally strong demand, bringing top prices—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Stocks have been reduced to nil, and prices have advanced, especially in view of small arrivals. G.G.B. "Angel White" brand—95s. to 100s. medium, 105s. to 110s. superfine. Barytes (carbonate), easy; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., and specially selected lump, finest quality, £13. Iron ore steady. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in strong demand at 18s. to 24s. Purple ore as last quoted. Spanish manganiferous ore continues in fair demand. Emery-stone: Best brands still scarce, and inquired for at full prices. No 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal further inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: High percentages selling at full prices. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos scarce, bringing increased prices. Porter's lead ore firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand; and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel in good demand at stronger figures. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

Gazette Notices.

Partnerships Dissolved.

NUTHALL, THORNLEY, and BOOTH, Hyde, hat manufacturers, as far as regards W. Nuthall.

C. F. Hole, and C. Maybury, under the style of the Nottingham Chemical Company, Nottingham, chemical manufacturers.

Adjudications.

EDWARD PRIME, Barrington, Cambridgeshire, cement manufacturer.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Mechanical Stokers. J. W. Claridge. 5,991. April 21.
Fluid-tight Joints for Pipes. J. Newton and D. A. Quiggin. 5,992. April 21.
Electric Heating Apparatus.—(Complete Specification). M. W. Dewey. 6,032. April 21.
Utilization of Electrical Energy.—(Complete Specification). M. W. Dewey. 6,041. April 22.
Syphons.—(Complete Specification). E. A. Meyer. 6,043. April 22.
Manufacture of Alkaline Silicates and Aluminates. J. Pointon. 6,046. April 22.
Manufacture of Alkaline Aluminates. J. Pointon. 6,047. April 22.
Manufacture of Alkaline Silicates. J. Pointon. 6,048. April 22.
Steam Generators. R. Cunliffe. 6,054. April 22.
Apparatus for Smoke Prevention. E. Cockerill and Son, and T. Cockerill. 6,055. April 22.
Steam Feed Water Apparatus. A. MacLaine. 6,059. April 22.
Photographic Developers. B. Jumeaux. 6,066. April 22.
Water Filters. J. W. Ward and C. Griffith. 6,080. April 22.
Kilns. E. Brook. 6,088. April 22.
Evaporation of Brine.—(Complete Specification). J. C. Mewburn. 6,107. April 22.
Pulverizing Machinery. G. J. Smith and T. H. Tregoning. 6,129. April 22.
Condensing and Cooling Apparatus.—(Complete Specification). J. Klein. 6,136. April 22.
Water Gauges. J. A. Hopkinson and J. Hopkinson. 6,141. April 22.
Electrical Switch. G. Schultz. 6,156. April 23.
Linings for Pulp Boilers. R. N. Redmayne. 6,161. April 23.
Secondary Batteries. G. Barker. 6,177. April 23.
Blue Colouring Matters for Cotton. S. S. Bromhead. 6,195. April 23.
Glazed Bricks and Tiles. W. R. May. 6,196. April 23.
Washing Fluid.—(Complete Specification). A. W. Curtis. 6,199. April 23.
Electrolytic Bleaching. S. Stepanow. 6,202. April 23.
Extraction of Gold and Platinum. C. T. J. Vautin. 6,216. April 23.
Production of Combustible Gas. S. Griffin. 6,217. April 23.
Galvanic Batteries. M. Ancizar. 6,223. April 23.
Ovens or Kilns for Firing Pottery.—(Complete Specification). A. Fielding. 6,231. April 24.
Tertiary Electric Battery.—(Complete Specification). A. J. Jarman. 6,236. April 24.
Supplying Water to Steam Boilers. C. Fouracre. 6,243. April 24.
Treatment of Sewage. C. G. Moor. 6,245. April 24.
Prevention of Boiler Incrustation. C. R. Bonné. 6,246. April 24.
Filtering or Purifying Liquids. J. Longshaw. 6,252. April 24.
Application of Anthracite Gas for Metallurgical and other purposes. T. D. Rock. 6,256. April 24.
Electrolysis. J. Marx. 6,266. April 24.
Electrolytic Apparatus. J. Marx. 6,267. April 24.

Apparatus for Controlling and Measuring Liquids.—(Complete Specification). H. Börner. 6,273. April 24.
Production of Blue-Grey Colouring Matters. O. Imray. 6,274. April 24.
Recovering Sludge of Washed Coals or Ores. H. Simon. 6,275. April 24.
Charging Coke Ovens. R. de Solderhoff. 6,282. April 24.
Rag-Cleaning Machinery. W. Gillespie. 6,297. April 25.
Washing, Scouring, and Bleaching Fibrous Materials. R. Harrison. 6,315. April 25.
Open Hearth System of Manufacturing Steel. S. Fox. 6,316. April 25.
Smoke Consumption. T. T. Vernon. 6,323. April 25.
Electric Meters. E. Batault. 6,326. April 25.
Production of Magnesium Oxide. F. M. Lyte. 6,333. April 25.
Improvements in Malting. W. Paterson. 6,337. April 25.
Dyestuffs. The British Alizarine Co., Limited, and D. C. Bendix. 6,346. April 25.
Manufacture of Coloured Paper.—(Complete Specification). H. H. Lake. 6,348. April 25.
Chimneys and Chimney Tops.—(Complete Specification). T. A. Meggeson and J. Hadfield. 6,358. April 26.
Machinery for Cleaning Cotton Seed. G. H. Croker. 6,368. April 26.
Improved Lining for Pump Boilers.—(Complete Specification). C. Kellner. 6,369. April 26.
Smoke Prevention. S. Bamforth. 6,371. April 26.
Storing and Expelling Liquid under Pressure. R. Haddon. 6,382. April 26.
Electric Motors. A. Blattner. 6,389. April 26.
Production of Caramel-Malt. L. Ramsel. 6,394. April 26.
Treatment of Sewage. F. B. Hill. 6,397. April 26.
Improved Steam Generator.—(Complete Specification). G. Dürr. 6,398. April 26.
Reverberatory Furnaces. J. von Langer and L. Cooper. 6,399. April 26.
Utilizing Waste Heat of Furnaces. J. von Langer and L. Cooper. 6,400. April 26.

New Companies.

J. A. EGESTORFF AND COMPANY, LIMITED.—This company was registered on the 24th ult., with a capital of £10,000, in £5. shares, to acquire the business of manufacturers of ultramarine, lime blue, wash blue paste, red oxide of iron, and metal polishing paste, carried on by Messrs. Egestorff and Son, of Backbarrow. The subscribers are:—

J. A. Egestorff, Backbarrow, near Ulverston, colour merchant	1
J. C. Egestorff, Backbarrow	1
F. O. Fell, Ulverston, contractor	1
C. B. Daniell, Ulverston, solicitor	1
A. H. Thorn, Cartmel, solicitor	1
J. Atkinson, Ulverston, stationer	1
S. E. Mayor, Barrow-in-Furness, solicitor	1

ST. ASAPH IRON, LEAD, AND BARYTA COMPANY, LIMITED.—This company was registered on the 29th ult., with a capital of £30,000, in £1. shares, to acquire land, and to carry on business as miners, smelters, and reducers of ores and minerals. The subscribers are:—

E. R. Jameson, 111, Bushey-hill-road, Camberwell, accountant	1
A. R. Hewitt, 15, Shepperton-road, N., clerk	1
W. F. Gardner, Rushey-green, Catford	1
J. M. Niven, 13, Blomfield-road, Shepherd's-bush	1
Frank Fuller, Esk-villa, Leytonstone, secretary	1
W. C. Castle, 123, Plimsoll-road, N., clerk	1
T. H. Baxter, 29, Hannibal-road, Mile-end, clerk	1

UNIVERSAL GREASE AND OIL COMPANY, LIMITED.—This company was registered on the 24th ult., with a capital of £5,000, in £1. shares, to manufacture and trade in oils, fat, chemicals, and other similar articles. The subscribers are:—

A. W. Kerley, 14, Great Winchester-street, solicitor	1
G. S. Pitt, East Dene, Willesden-green	1
T. H. Briden, 9, Lorrimer-square, S.E.	1
Hy. Verden, 14, Great Winchester-street, clerk	1
H. W. Broadhurst, 137, Fenchurch-street, grease manufacturer	1
Alex. Kerly, 14, Great Winchester-street, solicitor	1
A. G. Thielton, 20, Queen's-terrace, Peckham, clerk	1

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending April 29th.

Alum—
 Holland, £25 Hernu, Peron & Co.
 325 Ohlenschlager Brs.
Alkali—
 Holland, 300 c. E. Ogett & Sons
 200 Taylor, Sommerville & Co.
 " 208 Beresford & Co.
 " 200 bgs. H. Grey, jun.
 " 200 T. H. Lee
Acetone—
 Holland, £53 Beresford & Co.
Acetic Acid—
 Holland, 101 pks. A. & M. Zimmermann

France, 1 Pokorny, Fielder & Co.
Acetate of Lime—
 U.S., £204 Johnson & Hooper
 Halifax, 100 Bryce, Junor & Co.
Antimony Ore—
 Sydney, 9 t. L. & I. D. Jt. Co.
 Portugal, 10 H. Emanuel
 Spain, 10
 S. Russia, 1 M. D. Co.
Bones—
 Brisbane, 2 t. L. & I. D. Jt. Co.
 U.S., 34 Hicks, Nash & Co.
 Auckland, 2 Flack, Chandler & Co.
 Launceston, 1 J. Terry & Co.
 E. Indies, 207 T. H. Allen & Co.
 Sydney, 7 Flack, Chandler & Co.

Barytes—
 Germany, 22 cks. J. W. Harrison & Co.
 Belgium, 130 A. Zumbek & Co.
 Holland, 91 A. Boltz
 " 45 W. Harrison & Co.
 Germany, 47 "
Barium Chloride—
 Germany, £80 Petri Brs.
Cream of Tartar—
 Italy, 20 pks. C. Christopherson & Co.
 France, 3 T. Ronaldson & Co.
Copper Ore—
 Sydney, 72 t. L. & I. D. Jt. Co.
 Cossack, 27 W. Marden

Adelaide, 7 c. H. Bath & Son
 " 12 t. Harold Brs.
Caoutchouc—
 E. Indies, 91 c. Wrightson & Son
 " 105 Ralli Brs.
 U.S., 126 Kebbel, Son & Co.
 " 31 Mildred, Goyeneche & Co.
 Mozambique, 23 Elkan & Co.
 Zanzibar, 52 A. Frey & Co.
 " 13 Wrightson & Son
 Natal, 9 J. T. Rennie, Son & Co.
 Cape, 17 Lewis & Peat
 France, 15 Stiebel Brs.
 Zanzibar, 37 L. & I. D. Jt. Co.
 Quilimane, 24 L. & I. D. Jt. Co.
Carbonic Acid—
 Holland, 12 pks. J. G. Fisher

[illegible]

Tartar Salts—
Rotterdam, 10 cks.
Tartaric Acid—
Rotterdam, 14 cks.
Ultramarine—
Hamburg, 1 cs.
Rotterdam, 30 brls. 7 cs. 24 cks.
" 6 2
Yerdigris—
Bordeaux, 1 ck.
Waste Salt—
Hamburg, 1,304 bgs.
Zinc Oxide—
Antwerp, 25 cks. 53 brls 1 cs.

GLASGOW.

Week ending May 1st.

Antimony Regulus—
Marseilles, 38 brls. J. W. Quincy & Co.
Barytes—
Rotterdam, 46 cks.
" 9c
Chemicals (otherwise undescribed)
Hamburg, 3 cs.
Cream Tartar—
Marseilles, 5 brls.
Chrome Alum—
Rotterdam, 26 cks. J. Rankine & Son
Dyestuffs—
Alizarine
Rotterdam, 199 cks.
" 61
Extracts
Antwerp, 10 cks.
Rouen, 14
Sumac
New York, 30 bgs.
Marseilles, 100
Indigo
Marseilles, 4 cs
Glycerine—
Marseilles, 10 brls. A. Stewart & Son
Glucose—
Amsterdam, 5 cks
Pyrites—
Huelva, 1,592 t. Tharsis Co.
Antwerp, 100 t.
Phosphate of Lime—
Antwerp, 100 t.
Sulphur Ore—
Bergen, 180 t.
Tartaric Acid—
Marseilles, 10 brls.
Rotterdam, 8 cks.

Ultramarine—
Antwerp, 5 cs.
Rotterdam, 1 cs. 4 cks. J Rankine & Son
Waste Salt—
Hamburg, 203 bgs.
Zinc Oxide—
Rotterdam, 50 cks.
" 200

HULL.

Week ending May 1st.

Acids (otherwise undescribed)
Rotterdam, 3 cks. G. Lawson & Sons
" 1
" 30
" 37 Wilson, Sons, & Co.
Ammonia—
Antwerp, 1 ck. Wilson, Sons, & Co.
Barytes—
Rotterdam, 23 cks. Hutchinson & Son
Bremen, 10 cks. Veltmann & Co.
" 19 Blundell Spence, & Co.
" 60
Antwerp, 20 Bailey & Leatham
Bones—
Riga, 363 bgs. Wilson, Sons, & Co.
Bone Meal—
Bombay, 4228 bgs
Chemicals (otherwise undescribed)
Hamburg, 5 cs. Wilson, Sons, & Co.
Antwerp, 38 pks. " "
Hamburg, 5 cks. W. & C. L. Ringrose
Rotterdam, 4
Dyestuffs—
Alizarine
Rotterdam, 1 brl. G. Lawson & Sons
" 10 cks. Hutchinson & Son
" 1 W. & C. L. Ringrose
" 59
" 36 pks. Hutchinson & Son
Valonia
Smyrna, 218 t. 990 bgs. Brown, Atkinson, & Co.
" 530 t.
Extract
Rouen, 48 cks. Rawson & Robinson
Sumac
Catania, 50 bgs. Wilson, Sons, & Co.
Palermo, 1,535 pks
Myrabolams
Bombay, 10,254 bgs.
Rennet
Rotterdam, 2 cks. W. & C. L. Ringrose
Glycerine—
Amsterdam, 1 drum.

Glucose—
Hamburg, 15 cks. Woodhouse & Co.
Stettin, 57 Wilson, Sons, & Co.
" 40
" 800 bgs. C. M. Lofthouse & Co.
New York, 95 brls.

Manure—
Ghent, 50 t. Hammond, Emes, & Co

Phosphate Rock
Coosaw, 1 930 t.

Naphthalene—
Rotterdam, 19 cks. G. Lawson & Son

Potash—
Antwerp, 26 cks. Wilson, Sons, & Co.

Pitch—
Antwerp, 11 cks. H. F. Pudsey
Dunkirk, 25 Wilson, Sons, & Co.

Plumbago—
Hamburg, 10 brls. Wilson, Sons, & Co.

Sols—
Rotterdam, 50 cks. G. Lawson & Sons

Sodium Nitrate—
Iquique, 7,345 bgs

Sulphur—
Catania, 455 pks Wilson, Sons, & Co.

Sulphur Ore—
Seville, 1,230 t J. Dalton, Holmes, & Co.

Sulphate—
Christiansand, 100 pks. Wilson, Sons, & Co.

Stearine—
Rotterdam, 75 bgs Wilson, Sons, & Co.

Silicate—
Antwerp, 6 " "

Silicate—
Antwerp, 10 cks. Wilson, Sons, & Co.

Saltpetre—
Hamburg, 100 bgs. Wilson, Sons, & Co

GOOLE.

Week ending April 23rd.

Chemicals (otherwise undescribed)
Rotterdam, 1 ck.

Dyestuffs—
Alizarine
Rotterdam, 30 cks. 1 bx.

Logwood
Jamaica, 500 t.

Monte Christi, 391
Dyestuffs (otherwise undescribed)
Boulogne, 56 cks. 4 cs 3 pks.

Glucose—
Hamburg, 40 cks. 20 bgs.
Dunkirk, 120

Potash—
Hamburg, 12 cks.

Potassium Muriate—
Rotterdam, 20 cks.
Hamburg, 1,000 bgs.

Soda—
Rotterdam, 5 cks.

Saltpetre—
Rotterdam, 285 bgs.

Waste Salt—
Hamburg, 498 bgs.

TYNE.

Week ending May 1st.

Copper Precipitate—
Pomaron, 3 633 bgs. Mason & Barry

Glucose—
Hamburg, 50 bgs. Tyne S. S. Co.
New York, 25 brls. B. J. Sutherland & Co.

Manure—
Hamburg, 870 t J. C. Swan & Co

Pyrites—
Huelva, 1,373 t. Scott Bros.

Sulphur Ore—
Pomaron, 1,050 t. Mason & Barry

Salt—
Hamburg, 101 bgs. Tyne S. S. Co.

Saltcake—
Hamburg, 160 t.

Zinc Oxide—
Antwerp, 50 brls. Tyne S. S. Co.

GRIMSBY.

Week ending April 26th.

Chemicals (otherwise undescribed)
Hamburg, 33 cks. 10 pks.

Dyestuffs—
Extracts
Dieppe, 16 pks.

Dyestuffs (otherwise undescribed)
Hamburg, 2 cks.

Glycerine—
Dieppe, 10 cs.

Zinc Ashes—
Antwerp, 12 cks.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending April 26th.

Acids (otherwise undescribed)—
Cologne, 300 drs. £457
Acetic Acid—
Sydney, 1 t. 1 c. £30
Arsenic—
Amsterdam, 6 cks. £17
" 6
Aluminium Sulphate—
Bordeaux, 4 t. 19 c. £25
Ammonia—
B. Ayres, 20 cs. £46
Ammonium Muriate—
Gothenburg, 3 t. 3 c. £71
Ammonium Sulphate—
Ghent, 10 t. 5 c. £118
" 12 135
" Malaga, 8 4 90
" Amsterdam, 120 1,440
" Trinidad, 12 150
" Martinique, 100 bgs. 125
" Amsterdam, 62 798
Ammonium Carbonate—
Dunkirk, 1 t. 2 c. £34
" B. Ayres, 1 37
Alum—
Portland, 10 t 13 c. £54
Brimstone—
Portland, 8 t. 11 c. £47

Benzole Acid—
Philadelphia, 120 lbs. £30
Copper Sulphate—
Oporto, 10 t. £250
Bordeaux, 5 1 c. 105
Caustic Soda—
Algoa Bay, 1 t. 2 c 720 lbs. £75
" 13
Portland, 8 2 198
" B. Ayres, 1 4 17
Cream of Tartar—
Melbourne, 58 pks. £305
Sydney, 5 c. 28
Citric Acid—
Amsterdam, 5 kgs. £37
St. Petersburg, 1 t. 14 c. 246
Hamburg, 10 70
" B. Ayres, 1/2 3
" Leghorn, 5 37
" Melbourne, 5 5 kgs. 34
" Antwerp, 2 5 336
" Hamburg, 1 8
" Paris, 10 74
" New York, 3 400
" Oporto, 1 5 36
" Copenhagen, 1 7
" Hamburg, 10 70
Carbolic Acid—
Stettin, 1,036 gls. £165
" Malta, 6 c. 14
Carbolic Solid—
New York, 1 t. 3 c £150
Marseilles, 21 4 1,683

Calais, 1 t. 8 c. 85
Clarifiants—
Bordeaux, 37 cks. £82
Chemicals (otherwise undescribed)
Auckland, 4 pks. £101
Trintsin, 30 t. 3 c. 230
Natal, 42 pks. 78
Yokohama, 10 cs. 36
Sydney, 30 23
Adelaide, 32 55
Copperas—
Constantinople, 7 t. 7 c £18
Coal Products—
Tar
Malta, 6 brls. £9
Hamburg, 126 rlt. 71
Sydney, 100 drs. 28
Wellington, 3 11
R. Janeiro, 30 17
Durban, 36 pks. 13
E. London, 420 20
Danzig, 701 brls. 368
Cape Town, 20 5
Algoa Bay, 300 dms. 16
Sydney, 100 23
Pitch
Dunkirk, 145 t. £232
Antwerp, 425 640
Rouen, 298 476
Antwerp, 144 223
Dunkirk, 1,012 1,619
Antwerp, 112 174
Alexandria, 100 bls. 30

* Antwerp, 290 t. 331
" 175 286
Havre, bulk 201
Antwerp, 292 438
Dunkirk, 160 260
Seville, 155 250
St. Nazaire, 1,048 1,572
Naphthalene
Hamburg, 10 cks. 11
New York, 2 63 pks. 107
Genoa, 2 88
Antwerp, 1 8
Benzole
Rotterdam, 20 341
" 60 drs. 88
Antwerp, 40 rlt. 730
Anthracene
Cologne, 252 1,614
Dusseldorf, 417 2,934
Rotterdam, 252 2,000
" 62 410
" 107 450
Toluola
Rotterdam, 19 puns 231
Carbolic Acid
Alexandria, 21 t. 4 c. 1,680
Calais, 8 cks. 1 8 81
Cresosote
" 400 cks. 500
Naphtha
Adelaide, 75 gls. £20
Disinfectants—
Sydney, 2 cs. £31
Melbourne, 1,000 drs. 40 cs. 250

79 t. 16 c.	£640	Salvora, 1 t.	5	Almeria, 1	16	Oporto, 16	
30	00	Sydney, 1	5	Bordeaux, 5	3	Philadelphia, 50	
40	400	Pasages, 10 12 c.	52	Barcelona, 3		Piræus, 15	
phosphate—		Montreal, 25	118	Pasages, 10 2 3	200	Portland Or., 75	
39 t. 5 c.	115	Baltimore, 18 14 1 q.	85	Genoa, 23 18 3	505	Rotterdam, 58	
		Boston, 2 16 2	18	Leghorn, 8 12 2	182	Santander, 6	
		Valencia, 1 3 1	6	Naples, 10	200	Seville, 165	
11 t. 5 c.	£100	Ammonium Sulphate—		Trieste, 17	358	Dried Blood—	
10	70	Valencia, 50 t.	£625	Venice, 4 5	90	Barbadoes, 50 t.	£450
39	419	Bordeaux, 10 2 c. 1 q.	125	Calcutta, 5	102	Disinfectants—	
224 3	845	Valencia, 50 6 3	640	Barcelona, 10	212	Madras, 6 t. 11 c. 3 q.	£66
100	800	Acetic Acid—		Bordeaux, 8 17	216	New York, 5 cks.	45
573 16	4,806	Santos, 11 c. 2 q.	£13	Rouen, 59 11	4,487	Baltimore, 20 cs.	90
67 11	220	Borax—		Marseilles, 55 15	1,365	Epsom Salts—	
10 1	85	Matanzas, 9 c. 1 q.	£14	Genoa, 5 1 3	90	Constantinople, 10 cks.	
12 6	55	Samsoun, 16 1	30	Venice, 10 2	202	Montreal, 40 brls.	
120 bgs.	26	London (Ont.), 11 1	17	Nantes, 5 3	134	Rio Janeiro, 159 kgs.	
30 9	210	Odessa, 2 t. 3 2	6	Calcium Chloride—			
48 6	299	Rotterdam, 4	62	Wellington, 4 t.	£8		
34 3	170	Blood Albumen—		Brisbane, 2	11	Guano—	
119	450	Santos, 11 c. 3 q.	£57	Chrome Acetate—		Hamburg, 19 t.	£70
115	1,552	Brimstone—		Naples, 4 c. 2 q.	£11	Havana, 401 14 c.	£3,408
9 15	50	Perrambuco, 1 t. 13 c.	£13	Copperas—		Glycerine—	
2	22	Ponce, 4 5 1 q.	27	Smyrna, 3 t. 6 c. 3 q.	£10	Coquimbo, 2 c. 2 q.	£10
4	45	Boston, 25	106	Montreal, 3 3 1	7	St. John's, N. F., 1 t. 3 c.	120
36 19	290	Bleaching Powder—		Calcutta, 11 14 3	27	Ground Spar—	
82 13	912	Baltimore, 52 cks.		Constantinople, 3 t. 12 c. 2 q.	8	Havre, 96 t. 9 c.	£802
8	89	Barcelona, 40		Quebec, 3 7 1	2	Gypsum—	
17 2	188	Bordeaux, 33	172 tcs.	Rio Janeiro, 2 8 1	5	New York, 10 t. 1 c.	£30
25	250	Boston, 774	75 cs.	Rotterdam, 20 19 2	44	Iron Oxide—	
10	30	Calcutta, 14		Salonica, 4 6	10	Callao, 5 t.	£15
50	600	Copenhagen, 160		Smyrna, 6 10 3	14	Lime Superphosphate—	
25	250	Ghent, 56		Syria, 6 11 3	15	Montreal, 25 t. 3 c. 2 q.	£87
		Hamburg, 30 brls.		Adelaide, 3 19	9	Lime Hypophosphate—	
4 c.	£14	Malaga, 56 tcs.		Chemicals (otherwise undescr'd)		Calcutta, 1 cs.	£25
1 t. 8 c.	£55	Montreal, 339		Antwerp, 2 t. 16 c. 3 q.	£78	Lead Nitrate—	
6	12	Odessa, 31		Hamburg, 17 12	431	Lisbon, 3 c. 3 q.	£5
1 3	40	Palermo, 4		Constantinople, 3 13 2	107	Magnesia—	
Chlorate—		Philadelphia, 53		Ibrail, 1 10 1	52	Corunna, 1 cs.	
12 c.	£27	Rotterdam, 29		Galatz, 2 8	14	Magnesium Citrate—	
1 t.	45	Terneuzen, 25		Rio Janeiro, 2 5	22	Corunna, 2 q.	£6
5	210	Amsterdam, 6		Vera Cruz, 2 13	71	Manure—	
5	210	Antwerp, 62		Adelaide, 5 pks.		Trinidad, 1 t. 12 c.	£9
phate—		Bordeaux, 25		Amsterdam, 55 dms.		Bordeaux, 2 10	20
50 t.	£380	Boston, 58		Ancona, 10		Magnesium Sulphate—	
en, 206 5 c.	547	Genoa, 240		Antonina, 53	3 cks.	New York, 4 t. 7 c.	£30
3ay, 20 cs.	£50	Hamburg, 29	202 pks.	"		Oxalic Acid—	
17 pks.	1,120	Montreal, 14		Arica, 300	20 bxs.	Barcelona, 5 t. 1 c. 3 q.	£127
22 t. 16 c.	26	New York, 5 bxs.		Boston, 35		New York, 3 2 1	102
10		Oporto, 100 kgs.		Dunedin, 15		Barcelona, 1 7 2	43
120 brls.	£92	Tarragona, 6 brls.		E. London, 55	2	New York, 9 14	320
193	250	Caustic Potash—		Genoa, 6		Pitch—	
735 pks.	606	Montreal, 8 t. 1 c.	£170	Hamburg, 10		Cette, 1,162 t.	
ilphate—		Napier, 1	20	La Guayra, 10		Genoa, 300	1 ck.
115 t.	£115	New York, 10	10	Leghorn, 50		Havre, 49 18 c.	
7 t. 7 c.	£154	Cobalt Oxide—		Maceio, 30		Rouen, 10	
5	109	New York, 8 c. 3 q.	£425	Malaga, 10		Potassium Prussiate—	
2 10	55	Valencia, 1	55	Marseilles, 10		Rio de Janeiro, 10 c.	£45
10 12	55	Copper Precipitate—		Montreal, 50		Potassium Carbonate—	
4 18	106	Naples, 20 t. 1 c.	£725	Algers, 5		Montreal, 5 t. 11 c.	£78
		Charcoal—		Amsterdam, 60		New York, 9 6	131
230 t.	£322	Rotterdam, 50 t.	£210	Antwerp, 49		Potassium Chlorate—	
als—		Hamburg, 51	255	Barcelona, 90	36 cks.	Boston, 5 t.	£198
10 t. 1 c.	£30	Carbolic Acid—		Calcutta, 106		Brindisi, 1 10 c.	66
32 10	93	Hamburg, 4 t. 15 c. 1 q.	£67	Cartagena, 25	6 brls.	Coquimbo, 1	68
		Philadelphia, 1 3	90	Copenhagen, 16		Montreal, 1 10	47
		Coquimbo, 1	6	Dunedin, 50		Genoa, 1 10	76
7 t. 12 c.	£39	Yokohama, 2 17	176	Fairwater, 50		B. Ayres, 1 10	5
5 8	30	New York, 3 19	244	Galatz, 50		Hamburg, 12 10	685
carbonate—		Hamburg, 6 16 1	778	Havre, 150		Yokohama, 5 10	222
5 t.	£31	Havre, 1 4 2	140	Kurrachee, 35		New York, 7 10	300
id—		Rotterdam, 4 10	620	Lisbon, 20		Hioho, 8 3 q.	400
1 t.	£128	Copper Sulphate—		Maceio, 80		Stockholm, 10 8 3 q.	20
5	34	Barcelona, 38 t. 18 c. 2 q.	£956	Malaga, 10	2	Potassium Bichromate—	
1 18	245	Bordeaux, 2 4	53	Malta, 60		Rio de Janeiro, 1 t. 4 c. 1 q.	£45
ERPOOL		Monte Video, 15	8	Marseilles, 15		Calcutta, 11	21
nding Apr. 30th.		Bordeaux, 120 18	2,831	Matanzas, 8		Phosphorous—	
Muriate—		Odessa, 2	53	Montreal, 150	25	Shanghai, 15 c. 3 q.	£118
12 c. 1 q.	£15	Tarragona, 3 15	89	Naples, 20		Picric Crystals—	
21 t. 8	504	Valencia, 5 1	120	New Orleans, 100		Sydney, 2 c. 2 q.	£16
5 1 3	126	Barcelona, 5	100	"		Soda Ash—	
		B. Ayres, 1 15 3	47	New York, 1,538	75	Sydney, 321 brls.	
		Marseilles, 5 3 1	103	Oporto, 50		Syria, 100	
		Piræus, 9	12	Pasages, 10		Talavera, 20	
		Rio de Janeiro, 1 14	51	Perrambuco, 10		Toronto, 140	
3 q.	£7	Tarragona, 10	246	Philadelph., 100		Torrijos, 20	
Regulus—		Valencia, 10 3	254	Rotterdam, 20		Volo, 20	
4 c. 2 q.	£16	Bilbao, 10 2	240	Rouen, 65		Wellington, 32	
12	43	Genoa, 8 2	190	San Sebastian, 4		Yokohama, 127	
	556	Nantes, 28	410	Santander, 174	24	Aivali, 50	10 cks.
Carbonate—		Venice, 10 3	236	Seville, 11		Alicante, 22	326
2 t. 2 q.	£66	Barcelona, 10 3	120	Sydney, 11		Baltimore, 219 tcs.	
1 6 c. 3	44	Bordeaux, 79 9	1,835	Valencia, 16		Barcelona, 60	
1 1 3	44	Galatz, 2 9 2	55	Vigo, 3		Boston, 160 219	
1 1 3	5	Genoa, 105 2 1	1,950	Wellington, 32		B. Ayres, 150	47
2 2 3	70	Havre, 5 1	95	Nantes, 35	10 bxs.	Constantinople, 60	40
		Genoa, 31 12 3	568	Napier, 32		Dunedin, 78	
3 t. 15 c. 1 q.	£17	Marseilles, 192 12 1	4,570	Naples, 143	105 pks.	Leghorn, 15	
8 9 1	40	Trieste, 1 13 2	370	New York, 350		Maceio, 15	
2 18	14	Venice, 20 4	365	Odessa, 350			
		Valencia, 14 19 1	365				

Madrid,	85 brls.	
Napier,	20	
Oporto,	5	36 cks.
Philadelphia,	113	1,321 tcs.
Rio de Janeiro,	179	
Rosario,	50	
Seville,	50	
Montreal,		54
Adelaide,	50	
Baltimore,	66	44
Barcelona,	18	
Boston,		139
B. Ayres,	200	
Genoa,		15
Lisbon,		15
Montreal,		128
New York,		311
Odessa,	100	
Philadelphia,		566
Rio de Janeiro,	360	
Rosario,		50
Smyrna,	100	
Vigo,		2
Soda Crystals—		
Malta,	10 brls.	
Montreal,	764	
Napier,	34	140 cks.
New York,		280
Philadelphia,		
Portland Or.,	50	12
Singapore,		
Wellington,	68	50
Calcutta,		34
Freemantle,	15	340
Philadelphia,		
Portland Or.,	335	
Salt—		
Aarhus,	878 t.	
Ahwey,	10	
Ambriz,	10	
Archangel,	400	
Barbadoes,	67	
Benin,	25	
Brisbane,	50	
Cameroons,	100	
Dunedin,	15	
Gaboon,	50	
Kallundborg,	156	
Landana,	7	
Loango,	25	
Montreal,	423	2 c.
New York,	1,487½	
Old Calabar,	60½	
Philadelphia,	850	
Quebec,	1,093	14
Sierra Leone,	200	
Antwerp,	105	
Baltimore,	200	
Boston,	270	
Brass,	50	
Bruges,	198	
Chicago,	80	
Copenhagen,	649	
Freemantle,	5	
Hamburg,	312½	
Monrovia,	10	
Montreal,	521	6
North Sydney,	522	6
Pictou,	498	6
Sierra Leone,	71	
Sinoe,	75	
Trinidad,	35	17
Ukaka,	48	
Cape Coast,	6½	
Old Calabar,	70	
Sheep Dip—		
E. London,	1 t. 10 c.	£80
Cape Town,	15	40
Algoa Bay,	1	80
Sheep Wash—		
Montreal,	11 c.	£30
Sodium Silicate—		
Venice,	16 cks.	
Genoa,	173 brls.	
Messina,	10	
Naples,	100	
Oporto,	6	
Piræus,	15	
Santander,	3	
Sodium Bicarbonate—		
Batoum,	100 kgs.	
B. Ayres,		50 cks.
Chalcis,	20	
Lyttletown,	20	
Nantes,		4
Rotterdam,	25	
Seville,	100	33 brls.
Sydney,	100	
Wellington,	50	
Adelaide,	190	
Alexandria,		1 ck.
Algiers,	20	
Antwerp,		5 pks.
Barcelona,	250	
Bombay,	250	
Boston,		50
Calcutta,	500	

Genoa,	40 cks.	
Montreal,		1,070 pks.
New York,	20 kgs.	
Portland,	150	
Rotterdam,	20	
St. Petersburg,	400	
Sodium Bisulphide—		
Wellington,	15 c.	£9
Saltcake—		
Baltimore,	200 t. 7 c.	£443
Sodium Nitrate—		
Ancona,	7 t. 12 c. 1 q.	£63
Bari,	3	25
Seville,	12	104
Odessa,	10	87
Trieste,	13	42
Sodium Bichromate—		
Syria,	10 c.	£13
Sodium Biborate—		
Alexandria,	5 c. 3 q.	£9
Rotterdam,	2 t. 10	77
Montreal,	5	164
Sodium Chlorate—		
Rotterdam,	1 t.	£54
Salammoniac—		
Genoa,	10 c. 2 q.	£19
Hamburg,	9	18
New York,	5 t.	172
Oporto,	5	10
Palermo,	5	11
Syria,	9	16
Philadelphia,	4	144
Maceio,	5	10
Hiogo,	2	91
Colastine,	2 cks.	8
Saltpetre—		
Palermo,	10 c.	£11
Piræus,	15 t.	326
Ibrail,	5	6
Maceio,	3	62
Pernambuco,	8	192
"	5	120
Maceio,	1	27
Sulphur—		
Maceio,	7 c. 2 q.	£8
Montreal,	1 t. 5	11
Boston,	50	217
Quebec,	1	9
Boston,	50	225
Rouen,	30	153
Tar—		
Loanda,	20 brls.	
Manilla,	9 cks.	
Tartaric Acid—		
Coquimbo,	1 c.	£10
Tin Oxymuriate—		
Rio Janeiro,	2 c. 2 q.	£8
Tannic Acid—		
Rouen,	7 c.	£42
Zinc Chloride—		
Bombay,	2 t. 1 c. 3 q.	£42

TYNE.

Week ending May 1st.

Antimony—		
Hamburg,	10 c.	
Anthracene—		
Rotterdam,	11 t. 19 c.	
Alkali—		
Hamburg,	4 t. 6 c.	
"	5	13
Christiania,	5	8
Amsterdam,	22	15
Rotterdam,	5	11
Bleaching Powder—		
Newfairwater,	9 t. 12 c.	
Norroping,	54	7
Gothenburg,	12	3
San Francisco,	86	9
Hamburg,	24	11
Antwerp,	47	15
Dunkirk,	30	1
Amsterdam,	6	1
Copenhagen,	5	18
Rotterdam,	21	7
St. Petersburg,	879	13
Libau,	10	2
Caustic Soda—		
Odessa,	6 t. 19 c.	
Gothenburg,	10	4
Ferro Manganese—		
Dahlsbruk,	5 t. 5 c.	
Glycerine—		
Rotterdam,	6 t. 11 c.	
Litharge—		
Malta,	2 t. 4 c.	
Constantinople,	1	5
Hamburg,		10
Genoa,	1	1

Gothenburg,	2 t. 14 c.	
Copenhagen,		6
Rotterdam,		10
St. Petersburg,	2	14
"	8	10
Magnesia—		
Hamburg,	16 c.	
Antwerp,		2
St. Petersburg,		5
Muriatic Acid—		
Monte Video,	2 t.	
Napthalene—		
Antwerp,	306 bgs.	
Pitch—		
Copenhagen,	20 t.	
Potassium Chlorate—		
Newfairwater,	6 t. 15 c.	
Soda—		
Svendborg,	20 t. 3 c.	
Stockholm,	199	19
Odense,	23	14
Svendborg,	25	1
Ahus,	107	16
Drontheim,	36	18
Norroping,	47	19
Amsterdam,	25	
Copenhagen,	29	4
Rotterdam,	11	1
Soda Ash—		
San Francisco,	25 t. 7 c.	
Hamburg,	3	13
Gothenburg,	45	2
Newfairwater,	20	13
Odessa,	6	11
Copenhagen,	15	15
Libau,	10	5
Sodium Chlorate—		
Rotterdam,	1 t. 2 c.	
Salammoniac—		
St. Petersburg,	30 t. 5 c.	
"	3	4
"	12	2
Sodium Sulphate—		
St. Petersburg,	60 t. 13 c.	
Superphosphate—		
Esbjerg,	11 t. 15 c.	
Sodium Hyposulphite—		
San Francisco,	10 t.	
Sodium Silicate—		
Malta,	10 t. 4 c.	
Sulphur—		
Gothenburg,	40 t.	
Sulphuric Acid—		
Monte Video,	50	
Tar—		
Odessa,	12 t. 13 c.	

HULL.

Week ending April 29th.

Alum—		
San Francisco,	181 cks.	
Alkali—		
New York,	191 cks.	
Benzole—		
Hamburg,	14 drms.	
Bone Size—		
Bremen,	10 cks.	
Bleaching Powder—		
Antwerp,	24 cks.	
Christiania,	28	
Chemicals (otherwise undescribed)		
Antwerp,	32 cs. 4 cks.	
Abo,	18	
Bombay,	209	100 pks.
Bordeaux,	20	
Bremen,	51	
Bergen,	12	40 10
Copenhagen,	12 cs. 10	
Christiania,		66
Dunkirk,		22 30
Gothenburg,	5	
Hamburg,	2	19 76
Konigsberg,		120
Norroping,	20	
Rouen,	30	
Riga,	4	36 320
Rotterdam,	30	13 300
Stettin,	26	85
Stockholm,	5	13
Dyestuffs (otherwise undescribed)		
Antwerp,	1 ck. 3 kgs.	
Boston,	14	
Hamburg,		4
New York,	21 pks.	
Manure—		
Dunkirk,	738 bgs.	
Riga,	2 t.	
Rotterdam,	21	

Pitch—		
Antwerp,	400 t.	
Dunkirk,	146	
Tar—		
Copenhagen,	20 cks.	
Hamburg,	10	
Stettin,	3	

GLASGOW.

Week ending May 1st.

Ammonia—		
Penang,	2 t. 16 c.	£70
Ammonium Sulphate—		
Valencia,	159 t. 18½ c.	£1,840
Antigua,	2,472½	1,525
Alumina Sulphate—		
Montreal,	10 t. 18 c.	£40
Benzol—		
Rotterdam,	13 drums.	£298
Copper Sulphate—		
Rouen,	4 t. 19½ c.	£109
Rangoon,	12	130
Calcutta,	57½	20
Dyestuffs—		
Logwood		
Quebec,	612½ c.	222
Montreal,	45½	58
Fustic		
Montreal,	68	19
Dyestuffs (otherwise undescribed)		
Rangoon,	100 lbs.	22
Epsom Salts—		
Montreal,	15 t.	72
Christiania,	50 bgs.	£40
Litharge—		
Montreal,	9 t. 2 c.	£150
Quebec,	5	85
Manure—		
Antigua,	279½ c.	145
Potassium Sulphate—		
Antigua,	84½ c.	32
Potassium Bichromate—		
Antwerp,	103½ c.	175
Rouen,	49 t. 14½	1,551
Gothenburg,	5	175
Riga,	24½	44
Paraffin Wax—		
Bordeaux,	20 t. ½ c.	567
Pitch—		
Gothenburg,	245 t. 16 c.	£600
Salt—		
Antigua,	44 t. 15½ c.	£63
Superphosphate—		
Christiania,	50½ t.	252
Sulphuric Acid—		
Antigua,	5,040 lbs.	46
Sodium Bichromate—		
Antwerp,	100 c.	£125
Rouen,	17 t. 1½	468

GOOLE.

Week ending April 23rd.

Bleaching Preparations—		
Antwerp,	15 cks.	
Benzole—		
Antwerp,	79 cks.	
Rotterdam,	146	
Coal Products—		
Rotterdam,	163 cks.	
Chemicals (otherwise undescribed)		
Ghent,	1 ck. 13 drms.	
Hamburg,	50	
Rotterdam,	20	
Dyestuffs (otherwise undescribed)		
Boulogne,	2 cs. 18 cks.	
Ghent,	2 drms. 1	3 10 tins
Manure—		
Antwerp,	580 bgs.	
Boulogne,	165	35 shts.
Rotterdam,	198	
Pitch—		
Antwerp,	60 t.	
Ghent,	170	
Boulogne,	15 cks.	

GRIMSBY.

Week ending April 26th.

Coal Products—		
Dieppe,	55 cks.	

PRICES CURRENT.

WEDNESDAY, MAY 7, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
1/2 and 40 % per cwt	7/3	&	12/6
acial			67/6
G., 2000°	0	12	9
2 % nett per lb.	0	0	6 1/4
.. .. .	0	0	3 3/4
Tower Salts, 30° Tw. per bottle	0	0	8
Cylinder, 30° Tw.	0	2	11
Tw. per lb.	0	0	2
.. .. .	0	0	1 1/4
.. .. . nett	0	0	4
.. .. .	0	1	2 1/2
(fuming 50 %) per ton	15	10	0
(monohydrate)	5	10	0
(Pyrites, 168°)	3	2	6
(.. 150°)	1	8	0
(free from arsenic, 140/145°)	1	10	0
as (solution)	2	15	0
ure) per lb.	0	1	0 1/2
.. .. .	0	1	3
ite powdered per ton	13	0	0
(lump)	4	17	6
lphate (pure)	5	0	0
.. (medium qualities)	4	10	0
.. .. . per lb.	0	15	0
880 = 28° per lb.	0	0	3
= 24°	0	0	1 1/4
Carbonate nett	0	0	3 1/2
Muriate per ton	23	0	0
.. (sal-ammoniac) 1st & 2nd per cwt.	37/-	&	35/-
Nitrate per ton	40	0	0
Phosphate per lb.	0	0	10 1/2
Sulphate (grey), London per ton	11	6	3
.. (grey), Hull	11	2	6
l (pure) per lb.	0	0	10 1/4
lt	0	0	9 1/2
.. .. . per ton	75	0	0
(tartar emetic) per lb.	0	1	1
(golden sulphide)	0	0	10
loride per ton	8	0	0
rbonate (native)	3	15	0
lphate (native levigated)	45/-	&	75/-
Powder, 35 %	5	0	0
Liquor, 7 %	2	10	0
of Carbon	13	0	0
Acetate (crystal) per lb.	0	0	6
loride per ton	2	2	6
(at Runcorn) in bulk	17/6	&	35/-
yes :-			
(artificial) 20 % per lb.	0	0	9
.. .. .	0	3	9
Products			
ne, 30 % A, f.o.b. London .. per unit per cwt.	0	1	5
30 % nominal per gallon	0	3	9
50/90	0	2	9
Acid (crystallised 35°) per lb.	0	0	8 1/4
.. (crude 60°) per gallon	0	2	3
.. (ordinary)	0	0	2 1/2
.. (filtered for Lucigen light)	0	0	3
aphtha 30 % @ 120° C.	0	1	3
ils, 22° Tw. per ton	3	0	0
.b. Liverpool or Garston	1	8	0
Naphtha, 90 % at 160° per gallon	0	1	9
Oils (crude)	0	0	2 1/2
ili Bars) per ton	49	12	6
hate	25	0	0
le (copper scales)	52	10	0
crude)	30	0	0
l distilled S.G. 1250°)	55	0	0
.. .. . nett, per oz.	0	0	9
ite (copperas) per ton	1	10	0
de (antimony slag)	2	0	0
) for cash	14	10	0
rge Flake (ex ship)	15	10	0
ute (white)	23	5	0
.. (brown)	18	5	0
onate (white lead) pure	19	0	0
te	22	5	0

	£	s.	d.
Lime, Acetate (brown)	7	15	0
.. (grey) per ton	13	15	0
Magnesium (ribbon and wire) per oz.	0	2	3
.. Chloride (ex ship) per ton	2	5	0
.. Carbonate per cwt.	1	17	6
.. Hydrate	0	10	0
.. Sulphate (Epsom Salts) per ton	3	0	0
Manganese, Sulphate	18	0	0
.. Borate (1st and 2nd) per cwt.	60/-	&	42/6
.. Ore, 70 % per ton	4	10	0
Methylated Spirit, 61° O.P. per gallon	0	2	2
Naphtha (Wood), Solvent	0	3	10
.. Miscible, 60° O.P.	0	4	7 1/2
Oils :-			
Cotton-seed per ton	22	10	0
Linseed	26	0	0
Lubricating, Scotch, 890°-895°	7	5	0
Petroleum, Russian per gallon	0	0	5 1/2
.. American	0	0	5 1/2
Potassium (metal) per oz.	0	3	10
.. Bichromate per lb.	0	0	4
.. Carbonate, 90% (ex ship) per ton	19	0	0
.. Chlorate per lb.	0	0	4 1/2
.. Cyanide, 98 %	0	2	0
.. Hydrate (Caustic Potash) 80/85 % per ton	22	10	0
.. (Caustic Potash) 75/80 %	21	10	0
.. (Caustic Potash) 70/75 %	20	15	0
.. Nitrate (refined) per cwt.	1	2	6
.. Permanganate	4	2	6
.. Prussiate Yellow per lb.	0	0	9 1/2
.. Sulphate, 90 % per ton	9	10	0
.. Muriate, 80 %	7	15	0
Silver (metal) per oz.	0	3	10
.. Nitrate	0	2	7
Sodium (metal) per lb.	0	4	0
.. Carb. (refined Soda-ash) 48 % per ton	6	7	6
.. (Caustic Soda-ash) 48 %	5	5	0
.. (Carb. Soda-ash) 48 %	5	15	0
.. (Carb. Soda-ash) 58 %	6	17	6
.. (Soda Crystals)	2	17	6
.. Acetate (ex-ship)	15	15	0
.. Arseniate, 45 %	11	0	0
.. Chlorate per lb.	0	0	6 1/4
.. Borate (Borax) nett, per ton	29	0	0
.. Bichromate per lb.	0	0	3
.. Hydrate (77 % Caustic Soda) per ton	11	0	0
.. (74 % Caustic Soda)	9	17	6
.. (70 % Caustic Soda)	9	0	0
.. (60 % Caustic Soda, white)	8	5	0
.. (60 % Caustic Soda, cream)	8	2	6
.. Bicarbonate	6	0	0
.. Hyposulphite	5	10	0
.. Manganate, 25 %	9	0	0
.. Nitrate (95 % ex-ship Liverpool) per cwt.	0	8	0
.. Nitrite, 98 % per ton	28	0	0
.. Phosphate	15	15	0
.. Prussiate per lb.	0	0	7 1/4
.. Silicate (glass) per ton	5	7	6
.. (liquid, 100° Tw.)	3	17	6
.. Stannate, 40 % per cwt.	2	0	0
.. Sulphate (Salt-cake) per ton	1	6	6
.. (Glauber's Salts)	1	10	0
.. Sulphide	7	15	0
.. Sulphite	5	5	0
Strontium Hydrate, 98 %	8	0	0
Sulphocyanide Ammonium, 95 % per lb.	0	0	8
.. Barium, 95 %	0	0	5 1/4
.. Potassium	0	0	8
Sulphur (Flowers) per ton	7	15	0
.. (Roll Brimstone)	6	0	0
.. Brimstone : Best Quality	4	7	6
Superphosphate of Lime (26 %)	2	10	0
Tallow	25	10	0
Tin (English Ingots)	95	10	0
.. Crystals per lb.	0	0	6 1/4
Zinc (Spelter) per ton	21	10	0
.. Chloride (solution, 96° Tw.	6	0	0

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THE WIDNES BRINE SUPPLY BILL.

THE Bill to incorporate a company with £100,000. share capital in £10. shares, and £25,000. in debentures, for the construction of a pumping station for brine at Wincham, with a service reservoir at Keckwich, and lines of connecting pipes to take the brine to Widnes has just come before Lord Basing's Select Committee of the House of Lords. Mr. Littler, Q.C., Mr. Pembroke Stephens, Q.C., and Mr T. F. Squarey, appeared for the promoters of the Bill. Petitions in opposition to the Bill were deposited by the Cheshire County Council the Manchester Ship Canal Company, the Northwich Local Board the Widnes Local Board, the Northwich Guardians of the Poor, the trustees of the Weaver Navigation, property Owners in Wincham, the London and North-Western Railway, the Great Western and London and North-Western Railways, and the Bucklow District Highway Board. Sir Richard Brooke's petition against was withdrawn. Mr Littler, in his opening statement, said the proposal was an entirely new one. Widnes contained some of the largest alkali works in the world, and had the reputation of being the greatest vegetable killing place in the kingdom. Alkali, of course, could not be made without salt, but recently the old expensive Le Blanc process had been superseded by the ammonia-soda process, which had enabled Brunner, Mond, and Company to pay 30 per cent. dividends. The Bill was earnestly desired by the people of Widnes, and something must be done in the matter or Widnes would be ruined. The ammonia-soda process, in addition to its cheapness, had the advantage of causing no noxious gases or abominable waste. Salt could formerly be purchased in Widnes at 6s. 6d., but some ingenious gentlemen had devised the Salt Union, and, without any increase in railway charges put the price up to 9s. 6d. to customers who bound themselves for five years, to 12s. 6d. for those who bound themselves for two years, and to 14s. 6d. to those who would not bind themselves for any period at all. This increase in price had reduced the export trade in salt from 650,000 tons to 400,000 tons a year. The proposal was to pump the brine out of a farm of 75 acres out of a great bed of 2,500 acres. Lancashire ought no more to be debarred from taking brine from Cheshire than Cheshire ought to be debarred from taking coal from Lancashire. The whole interested opposition, the learned counsel concluded by saying, was that of the Salt Union.

At a later sitting, Mr. Littler intimated, on behalf of the promoters, that they were willing to be taxed to the amount of a penny per thousand gallons of brine pumped towards the county rates. Mr. Balfour Brown opened the case for the Nantwich Guardians, and contended that the Widnes trade would prosper in spite of the ammonia-soda process. The real purpose of the Bill was to break up the Salt Union. Mr. Thomas Ward, the Cheshire manager of the Salt Union, was then examined against the scheme, as was also Mr. James Mac-tear, who shewed that the evidence given in support of the Bill by Mr. A. E. Fletcher, the Chief Inspector of Alkali Works, was fallacious, and that, in fact, that so far from being ruined, the trade of Widnes had even up to the present day been expanding. He also stated that the establishment of ammonia soda works in Widnes would mean simply the addition of another trade to those already in existence. The continuance of the Le Blanc process was necessary for the production of bleaching powder of which the world required at least 140,000 tons annually. Mr. George E. Davis was also called by the opponents to shew that any decrease in the trade of Widnes had been brought about by artificial means, and he substantially corroborated Mr. Mac-tear's evidence.

The committee subsequently decided that the preamble was not proved, and the Bill was, therefore, thrown out.

EGED FRAUDS ON LISTER AND CO., LIMITED, AT BRADFORD.*(Continued from page 300.)*

inst., at the Borough Court, Bradford, Francis Stubbs, Heaton, and Henry Varley, drysalter, East-street, Leeds, were ordered to answer the charge of having conspired by false defraud Lister and Co., Limited, at Manningham Mills, sums of money. The magistrates on the bench were Mr. Stipendiary, Ald. Smith-Feather (Mayor), Mr. R. Kell, Ald. Bler, and Mr. H. Waud.

(in the absence of Mr. Waugh, who was engaged elsewhere for the prosecution; Mr. Kershaw (instructed by Mr. Stubbs) represented Stubbs; and Mr. Warren (Ford and Warren, Bradford) represented Varley.

After Henry Stancomb, assistant cashier at Manningham Mills, produced a bundle of receipts and invoices relating to transactions between Richard Varley between March, 1889, and February, 1890, and Woodhead, clerk with Messrs. Brownhill and Co., 6, Market-street, Liverpool, produced a copy of his firm's invoice to Varley of the sale of 250 boxes of cutch at 25s. 6d. per cwt., 25th, 1889; and of 10 boxes at 26s. per cwt., on October 1889. In cross-examination by Mr. Warren, he said the price of cutch was considerably higher—*from 15s. to 34s. per cwt.* The terms of sale were 14 days, the buyer paying carriage from Liverpool, and the price would be from 9d. to 1s. per cwt. He was not aware of any sale to Lister and Co. It was a common practice for Lister and Co. to buy large quantities of cutch for storage. Some qualities were greatly in storage, and becoming less in weight, it came at a higher price. He had been with Messrs. Brownhill and Co. for years, and their transactions with Richard Varley had always been of a straightforward character.

Derick Maton, market clerk with Messrs. Dalton and Young, 1, Market-lane, London, produced copy of an invoice of cutch sold to Varley on January 10th, 1889.

Warren objected to this as being too remote in date to be the charge being that the accused conspired between March, 1889, and February, 1890.

Stubbs said he thought he was justified in putting in evidence as much as in January.

Stipendiary Magistrate upheld the objection, and the witness was allowed to proceed.

Joseph Hindley, a partner in the firm of Buckle and Company, 1, Market-street, Horton, stated that his firm in July last bought from Varley 50 boxes of cutch at 27s. 6d. per cwt.; in February 1890 was purchased at 27s. 6d. per cwt.; and in March and April 1890, per cwt. The carriage was paid by the seller. In cross-examination by Mr. Warren, he said the cutch supplied to his firm was "bull cutch," and it was bought for future delivery as without any alteration in price. He was aware that cutch of this quality fluctuated in value, and that at present it was dearer. He said that his firm had got a good bargain in purchasing cutch at that time.

William Storey, clerk to Messrs. W. and A. Bowditch, 43, Market-lane, London, proved that in July last his firm sold to Richard Varley 50 tons of fustic roots at £3. per ton, the buyer paying the carriage. In cross-examination, he said roots were the lowest quality being 20s. or 25s. cheaper than the best Jamaica fustic. The price of £3. per ton was the lowest price he had known during his experience for thirty years. "Selected fustic" was the portion picked out of the bulk. In re-examination by Mr. Neill, he said that the selected fustic was £5. to £5. 10s. per ton.

After Fenton, cashier to Messrs. Sands, Wilson and Company, 1, Market-lane, Birstall, proved the purchase from Richard Varley of 50 tons of fustic roots at 6s. 3d. per ton, in November last and March last of rasped dried fustic at 6s. 3d. per ton, and in January last of chip fustic at 6s. 3d. per cwt. In cross-examination by Mr. Warren, he said the fustic purchased by his firm was not the best quality.

George Wood, dyer, Birstall, stated that in July and August 1889, he had purchased from Richard Varley rasped fustic at 6s. per cwt. In cross-examination, he said he had no knowledge of plush dyeing, and that he was unable to say whether the use of this quality of fustic would be prejudicial to plush.

Thomas R. Kaye, manager for Messrs. Young and Co., dyers, Valley Mills, Bradford, proved that in February last his firm purchased from Richard Varley a quantity of bull cutch at 31s. carriage paid. In cross-examination, he said that at the time of making the contract, which was twelve months before the cutch was at the lowest price he had ever known it. The cutch was obtained during the past fortnight was 38s. for a small quantity; could not get a quotation for a large quantity. He knew about plush finishing, having been for four years with Lister and Co., as plush finisher. At the beginning of 1884,

the orders for dye-ware were given by F. Hull, who certainly saw the prices, if he did not fix them. Stubbs told A. Taylor what articles were required, and the list, after being made out by the latter, was handed to Hull, by whom it was passed on to the drysalters. While he was finisher, Messrs. Lister and Co. reduced the quality of their yarn, which rendered the work of dyeing and finishing more difficult. He had occasion to complain of this, and repeatedly asked Stubbs if he had changed his drugs. Mr. Reixach, the manager, put a similar question to him; and, when he answered that he had not, he was told that he must keep up the quality, and not get cheap drugs. In cross-examination by Mr. Warren, witness said that the contract for cutch to be supplied at 31s. per cwt. extended over two years, and he considered the bargain was a good one. In re-examination by Mr. Neill, he said it was a matter of common knowledge at Manningham Mills that F. Hull saw the drysalters at the lodge. After 1884 Stubbs saw them, and he had the fixing of the prices.

Mr. James McMullen, import manager for Messrs. D. Midgley and Co., general merchants, Princess-street, Manchester, proved that his firm on the 12th February last sold to Richard Varley a quantity of maracaibo for fustic at £4 per ton, carriage being paid by the buyer. In reply to Mr. Warren, he said this was the commonest quality of fustic.

Mr. Ferdinand Roussey, bookkeeper and correspondent with Messrs. Lloyd and Co., general merchants, Gracechurch-street, London, stated that his firm sold to Richard Varley, on July 8th, 1889, a quantity of sumac at 9s. per cwt., on October 23rd at 9s. 6d. per cwt., and on February 25th, 1890, at 9s. 6d. per cwt. The terms were cash within 14 days, and 1¼ per cent. discount, the buyer paying the carriage from Palermo. In cross-examination by Mr. Warren, he said that in March, 1889, there was a sale of star brand sumac to Richard Varley at 10s. 3d. per cwt., but he had not brought a copy of that invoice, because it was not asked for the Chief Constable. There was a higher-priced sumac than that supplied to Varley, and it was sold at from 6d. to 9d. per cwt. more.

Mr. Owen Elias, clerk with Messrs. Rock and Co., wool, leather, and sumac merchants, London, proved the sale to Richard Varley during last year of various quantities of sumac at 9s. 6d. per cwt., the carriage being paid by the buyer. In reply to Mr. Warren, he said there was no other price for sumac at that time.

Mr. Moses Gaunt, tanner, Armley, said for the past eighteen years he had dealt with Richard Varley, and during the past twelve months he had purchased sumac from him. In December last he bought a quantity at 13s. 3d. per cwt., delivered without charge. In February last he made another purchase on the same terms. Cross-examined by Mr. Warren, he said there were many qualities of sumac, and he had paid as much as 16s. 6d. per cwt. to Varley's and others for it. Tanners used large quantities of sumac, and therefore bought large quantities at a time. He had always found Varley's firm strictly honourable in all their transactions.

Mr. James A. Swan, clerk with Messrs. Schott, Segner, and Co., aniline dye merchants, Manchester, proved that between July, 1889, and March 3rd, 1890, there had been about twelve sales of acid magenta (fast red) by his firm to Richard Varley, the price in each instance being 3s. per lb., carriage to Leeds paid, and a discount of 2½ per cent.

Mr. William Kilner, drysalter, 42, Brook-street, Bradford, said that for 20 years he had held an agency for Messrs. Kalle and Co., Biebrich, Germany. For several years he had sold to Richard Varley a blue known as OOX; but at first it was described as "Four B." At Varley's request it was altered in shade, a deeper blue being required. The price in April, 1884, was 8s. Afterwards a mixture of two qualities was made to match a sample supplied by Varley's, as Kalle and Co.'s "Five B" was too strong in colour. The article known as Blue OOX was supplied in tins, which he forwarded to Varley's in the same state as they were delivered to him. During last year and up to February of the present year he had supplied quantities of Blue OOX to Varley's, but to no other drysalters. He had, however, tried to sell to dyers, and had called at Manningham Mills on eight or ten occasions during the past year to endeavour to get an order. He had several times seen Stubbs there, but had not been able to get an order for blue. During the past fortnight he had obtained an order for blue from Lister and Co., and he had sold it at 6s. per lb. It was the same quality of blue as he had supplied to Varley's at 5s. 9d. per lb., and which they invoiced to Lister and Co. as blue OOX.

Cross-examined by Mr. Kershaw.—He several times saw Stubbs when he called at Manningham Mills; but he was not able to tell Stubbs that the blue he was offering was identical with the blue OOX which was being supplied by Varley's. On one occasion Stubbs said he should like to do business with him, but it would not do to change their drugs then, because their shade cards had been sent out, and those would have to be matched in the goods. Stubbs had never said if he (witness) could produce something new it might be put on the shade card, and he would get the benefit of it.

Cross-examined by Mr. Warren.—The marks on the tins had refer-

ence to the tare of the empty tins, and if they were not rubbed off there would be nothing to indicate to Lister and Co. where Varley's had obtained them. On the 22nd ult. he received a message requesting him to go to Manningham Mills; and after being shown the tins supplied by Varley's, he identified them as having been obtained from him. He was then asked to quote a price, and he mentioned 7s., but as he found that they had ascertained the price at which it had been sold to Varley's, he agreed to supply it at 6s.

Mr. Frederick John Hicks, cashier at the Leeds and County Bank, Limited, said he appeared under a subpoena calling upon him to produce all cheques on the bank issued by Richard Varley on the said bank, and cashed at such bank or any of its branches, between February, 1889, and February, 1890. He did not produce them, because they were not under his control.

Mr. Neill said he saw the bank manager, and told him exactly what was wanted. It was at that gentleman's suggestion that he served the subpoena on Mr. Hicks. He must now serve the notice on the manager.

Mr. Warren said this was another "fishing" expedition on the part of the prosecution, although the higher Court had already decided against a similar application.

The Court then adjourned till Wednesday morning.

The first witness called by Mr. Waugh was George Whitford, who has already been referred to in the course of the case as the person who gave the information in the first instance to Messrs. Lister and Company, which caused investigations to be made, and ultimately proceedings to be taken. The witness deposed that he was by business a clerk, and resided at 6, Heed Terrace, Burmantofts, Leeds. Formerly for about nine years he was employed by Mr. Richard Varley, dry-salter, of East-street, Leeds, as bookkeeper, but was discharged on March 21st or 22nd. He was told at the time that the reason of his dismissal was because he went late, and Mr. Varley also told him that he would not be allowed to do as he liked at his next place. After witness had given evidence at considerable length as to the mode of ordering goods by Varley and the persons from whom they were ordered, Mr. Waugh questioned him with regard to the supply of goods by Varley to Listers. Mr. Richard Varley had supplied cutch to Listers during the 12 months ending March 1st, 1890, in large quantities. They had also supplied cutch during the same period to Messrs. Young and Company, Bradford, Messrs. J. Buckle and Company, Great Horton, and Messrs. Sult, of Saltaire. Salts had different brands of the cutch, but Listers had always had "Cock" brand except on the last occasion, when "Bull" cutch was sent. The cutch was sent from Liverpool by rail in boxes, or from London by steamer, to Varley's. The boxes were not opened or anything done to the cutch before it was sent to Listers'. The cost of cutch to Varley was from 25s. to 28s. per cwt. Mr. Waugh was asking further questions with reference to the prices at which the goods were sold to customers, but Mr. Warren objected, unless books or invoices were produced. The Stipendiary upheld the objection. Further questions were asked from witness as to the supply to Varley of "Star" sumac, such as was supplied to Listers by them. The sumac cost 9s. 6d. per cwt. in Palermo. The carriage to London was 12s. 6d. per ton, and from London to Leeds 15s. The sumac purchased from Rock and Co. cost 9s. 6d. in Liverpool. It was named "Basso" brand, and the carriage from Liverpool to Leeds payable by Varley's was 15s. per ton. Listers were charged 15s. per cwt. for both brands, while small quantities of it were supplied to Mr. Moses Gaunt, tanner, of Leeds, at 13s. 3d. per cwt. Salt and Co. had "Basso" brand supplied to them at 11s. per cwt. Dealing next with fustic, witness detailed the firms from which Varley's made purchases, the price paid varying from £3. to £4. 17s. 6d. per ton delivered at Goole. The carriage from Goole to Leeds was 5s. per ton. It came in logs, and was either "chipped" or "rasped" by machinery, which would have the effect of making it into a powder. Varley's charged 30s. per ton for doing this work for other people, and after "rasping" water was added, which would increase the weight from three to five cwt. to the ton. The quality sold to Listers was composed of best and common mixed, and contained fustic roots, Maracabio, Corimbo, and Jamaica. Listers were charged 9s. 6d. per cwt. for it, and other firms were charged from 6s. to 6s. 6d. for the same kind. Varley's bought "acid magenta" from Schott, Segner and Co., Manchester. The tins in which the dye was sent were removed by Varley's, and Varley's labels put on in their place. The cost price was 3s. per pound delivered in Leeds, and it was invoiced to Lister and Co. at 7s. 9d. per lb. They did not supply it to anyone else. Varley's also supplied Lister and Company with a dye called Blue OOX. It was really an alkaline blue known to the trade as BBBB, and was bought from Mr. William Kilner, of Brook-street, Bradford, the price paid being 5s. 9d. per pound. Prior to the past twelve months Varley had bought similar blue to that referred to from Messrs. Offenbach, of Bradford, at the same price they paid to Kilner, and had sent tins of it to Listers along with the tins of Kilner's.

Listers paid 18s. 6d. per lb. for the blue delivered, Varley's paying the carriage, which would not amount to ¼d. per lb. Witness kept some of the books of Richard Varley, and knew Harry Varley kept an account with the prisoner Stubbs. The book in which it was kept was kept in his private drawer. Two books were produced at this stage, and witness said they were principally in Harry Varley's handwriting. Every month Harry Varley took the weights of the goods supplied to Listers from the sales day book and entered them in one of the books produced. Witness had assisted him by calling out the weights from the day book. After the account was made up for the month, Harry Varley used, as a rule, to make a cheque out to himself for the amount which was entered in the books as due to F. Stubbs. There were two entries in the book already referred to for July 21st and October 21st, 1889, respectively. The first said, "Paid for this month, £75. 3s.," and the second one, "Paid on account, £100. Due F. S. £25. 14s. 9d." The entries were in the handwriting of Harry Varley. He had cashed the cheques for Harry Varley. Telegrams had passed between the two prisoners when the cheques were drawn. He had heard conversations between Harry Varley and Richard Varley. About two months ago Harry Varley and Richard Varley were talking about Stubbs, and Harry Varley said Stubbs could not leave under six months notice. Witness was 22 years of age. From time to time he had received money for Varley's a few times—perhaps a score or two; he could not say how many. On the 6th of March last witness received £5. 6s. 8d. from Messrs. Richardson and Company at Varley's office. It was not his duty to enter into the ledger the receipt of money unless specially told to do so. He had made entries into the ledger of moneys purporting to have been received. Answering further questions by Mr. Warren, the witness said that when he received money he entered the amount on the counterfoil of the receipt book. Three or four days after he left he went to Varley's and was asked where the sum of £5 6s. 8d. was, and he afterwards told Varley that he had paid it to him at the office. Varley replied that he did not remember it. He first gave information in this case on Easter Monday. He was discharged on the 21st March. He was not discharged because he was always behind with his work. He made an extract from the books before they were taken possession of by the police. He refused to say where he made the extract at first, but upon being pressed he stated that he made the extract at Listers' office. He took the book to Listers' offices, having previously obtained it from Varley's on the Thursday morning of Easter week. He had then left Varley's employment for over a week. He got the book about half-past eight in the morning. He did not expect any of the Varley's would be there then. There were some of Varley's men present. The book was in a locked drawer, and he got it by taking out an unlocked drawer which was above. He did not steal the book, he only borrowed it. Mr. Lee, secretary to Lister and Company, said he was to bring the book, but not how he was to get it. He had told Mr. Lee he could get it. Mr. Reixach was present. Witness made the copies of the accounts partly in the presence of Mr. Lee and Mr. Reixach. The witness went on to explain how he returned the book to Messrs. Varley's office, stating that just as he was putting it into the drawer someone came into the room and asked him what he was doing in the room. Witness made the excuse that he had come for a coat which he had left some time previously.

The examination of this witness was resumed on the following day.

In reply to questions, witness said that cutch was purchased by Varley and Company from a great many persons and sold again to a lot of people. Sumac was purchased also from a lot of people and stored. He had had no communication verbally or otherwise with anyone about the matter prior to the writing of the letter to Mr. Lister.—Cross-examined by Mr. Kershaw: He never saw Stubbs at Varley's works.—Re-examined by Mr. Waugh: He had never known any blue to be returned from Listers to Varley. There was no truth in the suggestion that he retained the sum of £5. 8s. 9d. about which he was cross-examined yesterday.—Mr. Hermann Offenbach, drysalter, of St. John-street, Bradford, gave evidence as to the supply of alkaline blue to Richard Varley, of Leeds. Cross-examined by Mr. Kershaw: He had been at Listers, had seen Mr. Stubbs there, and had got orders for other kinds of dyes. He had supplied Indian yellow, and Mr. Stubbs had got the price reduced from 6s. 6d. per lb. to 3s. 6d.—Mr. Sidney Smith, sub-manager of the Bradford District Bank, deposed that Stubbs had had a banking account there since 1881. From July to October 8, 1889, Stubbs paid in to his account £600, and there was only one withdrawal—for £80. He paid in various £100 and £50 Bank of England notes.—Mr. Alfred John Holliday, chief cashier to the firm of Lister and Company, said he had paid Stubbs's salary, which had been £550 per annum since December 1, 1888, when Lister and Company became a limited company. He never paid to Stubbs a £50 or £100 note.—Inspector Edwin Hey gave evidence as to the arrest of the prisoner Varley, at Leeds, on April 15th. Varley's father and brother came up, and they asked to be allowed to see their solicitor, Mr. Warren. This was complied with, Mr. Warren being seen in the Great Northern Hotel. While waiting for Mr. Warren, Mr. Richard

to the prisoner: "I don't see we have anything to fear in don't see we have done anything wrong. We have simply Stubbs commission for orders we received from him. If we see so somebody else in the trade would have done so. We see this loosely, as you will see from the books you have kept a proper account of what we have paid Stubbs. Varley then remarked, "I have done nothing no more than paying him his commission. If I had not done so, in the same trade I would have done so and got the trade." Sidney then remarked, "If we were not to do this, we would put the shutters up." Detective Butterworth said that of April he went with the chief constable to Manningham where arrested the prisoner Stubbs. The Chief Constable then, and in reply the prisoner said, "I have nothing to shall have to see my solicitor. I don't know anything else's only what the firm does. This closed the case for the day."

After some conversation with the counsel engaged, the said he did not think he should be justified in withdrawing from a jury. Counsel for the prisoners then intimated that reserve their defence.

COMMERCIAL TURPENTINE OIL.

BY ARTHUR WILSON.

Section of the adulterants of turpentine oil, especially when coming in small quantities, present difficulties even to the expert operator. They may be arranged in two classes, viz.,—1. Turpentine with petroleum spirit, shale spirit, coal tar oil, &c. 2. Mixture of two classes of turpentine such as Russian and American.

It is a well-known fact that Russian turpentine oil is wholly unsuitable for the purposes to which turpentine oil is applied, so that it is important to be able to detect such an addition, and it may be said that it is a work of no ordinary difficulty. According to the method known as the turpentine "fake" is practised, which brings up the density of an adulterated oil of turpentine to that of genuine article, by the addition of rosin oil of high density. This is the truth or not, in a large number of samples I have failed to detect its presence. The examination of oil at the present time relies very much on the behaviour of the oil on distillation, together with the Halogen absorption, but the perfect scheme includes

1. Ordinary and fractional distillation.
2. Halogen absorption.
3. Behaviour with sulphuric acid.
4. Optical activity.
5. Certain simple tests.
6. Specific gravity.

Specific gravity of commercial oil of turpentine varies between 85 and 87, and any samples above or below these must be regarded as suspicious. Of 20 samples recently examined, the highest was 86.5, the lowest 85.01. Specific gravity is best determined by the balance. The optical activity of commercial turpentine oil is of very much value, but if an oil possesses a high value for S. D. it is possibly be highly adulterated. The values of S. for the D. number of samples, I have recently examined were

	Maximum.	Minimum.
{ S } D=	+ 15.29	+ 12.05

—A Laurent instrument was used for these determinations. If the above values were for oils sold at small shops as well as applied to large consumers. The optical activity is of no use in distinguishing between American and Russian oil of turpentine, as in the case of French oil on account of the laevorotatory nature of the latter. Certain simple tests have been proposed, but they are of little value, in mixtures of turpentine and its adulterants. The use of sulphur has been proposed by Warren, but my experience is in its favour, although as a test for the fixed oils and fats it is of no use; the same remarks apply also to Valenta's test with glacial acetic acid. Rosin oil is usually tested for by means of stannic chloride, but stannic bromide as proposed by Mr. Allen.

The test depends upon how the stannic bromide is prepared, so that in some cases it is better to substitute the test with acetic anhydride and uric acid, in which case a beautiful red or reddish violet colour is produced if rosin oil be present. The test can be applied to the residue left on distillation by steam. Warren's test with alcoholic potassium in my experience, of very little use.

Halogen absorption of turpentine is of much value if properly applied, in all cases a large excess of the reagent being present, as it is the bromine or iodine.

Petroleum spirit and shale spirit absorb 30 and 70% respectively of

bromine. I have usually found the bromine value to average 215, and the iodine value (by Hubbs' process) 331.

The distillation test, when conducted in its simplest form, is an excellent distinguishing test for turpentine and turpentine adulterants, when alone, and even when present in moderate proportion in a mixture, but when small percentages are present its indications are not of much use. The following table shows the average results, when 100 c.c. of the sample were distilled in a 16 oz. flask with a side tube, the thermometer bulb being placed in the usual position near the side tube:—

Percentage distilling at T. temperature.	T.
40.1	148.5°C.
62.0	149.0
78.0	150.0
90.0	153.0

The greatest range I have met with in genuine turpentine was in the case of a sample of boiling point 157.5°C., giving 20% at 158.5°C., and 92% at 184.0°C.

Fractional distillation, when carried out by the aid of a dephlegmator such as Le Bel, Glynsk, or Hempel, are of much more value than the above simple distillation test. The undermentioned results were obtained by a Glynsk dephlegmator in a simple manner to the analysis of benzols. The specific gravity of the distillate is taken by a Sprengel tube:—

Temperature C.°	Volume distillate.	Specific gravity of distillate.
156°	20%	862.9
156.25	40%	864.28
156.7	60%	863.1
159.0	80%	864.54
Tailings		873.21

Difference between density of tailings and 1st fraction 10.4

Difference between original density and tailings 6.61

Fractional distillation is much more likely to detect such adulterants as shale and petroleum spirit, than is a simple distillation. It may be interesting to show the difference when fractional distillation is applied to a sample, as against a simple test in a flask with a side tube.

FRACTIONAL DISTILLATION. SIMPLE DISTILLATION.

Temperature, C.°	Vol. Distillate.	Temperature, C.°	Vol. Distillate.
156°	20 %	160°	23 %
156.25	40 "	161°	45 "
156.75	60 "	162°	57.5 "
159.0	80 "	163°	65.5 "
.. ..	..	164°	71.0 "
.. ..	..	165°	78.0 "
.. ..	..	166°	86.0 "

A method of analysis, due to Professor Armstrong depends on the polymerization of turpentine oil, whilst petroleum naphtha is very little affected. On the other hand, rosin spirit is very much affected, and cannot safely be detected. 250 c.c. of the sample are treated with 75 c.c. of a cooled mixture of 2 parts of H₂SO₄ and 1 of water, in a globular separator. The acid should be added about 20 c.c. at a time, agitating well and avoiding much rise of temperature. The acid layer is then tapped off, and the oily liquid steam-distilled till nothing more comes over. The water is separated from the oily portion of the distillate, and the latter measured, and treated again with half its volume of 4/1 acid, then steam-distilled as before.

Genuine oil of turpentine usually gives a second distillate, averaging from 3 to 6% of the original liquid taken, according as the operation has been more or less successful. Any excess over 4% may be reckoned as due to a foreign oil. I have found that by carefully conducting the operation, and using 3/1 acid in the first treatment, the second will not be more than 4% by volume. Should it measure more it is advisable to treat it again with 4/1 acid. The amount of heat developed in the acid treatment varies, but it is not advisable to add the whole of the acid at one time.

In conclusion, the oleo-refraction has been proposed to detect turpentine adulterants, but very little work appears to have been done with it, at least in this country.

THE dinner given the other day in Baltimore, where, according to the *Electrical World*, waiters were superseded by an electric car that darted out of the pantry and served the courses with neatness and dispatch, opens a magnificent vista of future peace. Such a servitor would be a blessed relief from the polyglot importunity of the animate things that we endure to-day. It would demand only its regular wages of current strictly in advance, and would never extend a wheel or switch for tips. Better than all, it is dumb and of unequalled sobriety. Hasten the day when we shall find it in every household.

FLAMES.*

(Concluded from page 303.)

FLAME never exists except during the process of combination of two or more gases or vapours. As a familiar instance of both forms of combustion, there is no more striking example than coke or charcoal, which if burnt at once to carbonic acid burns entirely without flame. If the supply of air is deficient, carbonic oxide is formed, which, being a combustible gas, burns with a flame. I have here a curious experiment showing that the so-called air gas, which is composed of air saturated with gasoline or benzoline vapour, is neither a gas nor a perfect mixture or combination. The flame, produced under the conditions I show you, proves beyond question that the volatile gasoline is unequally diffused through the air, and that it exists in small centres. You will see that each of these becomes a separate and distinct centre of combustion, the result being, perhaps, one of the most beautiful effects ever produced by flames.

It is a very common thing to hear of white flames, although, so far as I am aware, white flames do not exist. We can get them red, blue, green and yellow, shading off to very pale lemon colour, but a really white flame I have never seen, nor have I seen a flame of any pure colour, all are so mixed as to be useless for optical experiments on colours. The sources of light which are really white are, to the best of my knowledge, all flameless, or, to speak more correctly, the flame is not the source of the light. I may refer, as examples, to the electric arc, the lime light, and the magnesium light, all of which are caused by solid bodies intensely heated. You will see that when I burn this magnesium wire the gas flame which is usually called white is really a dirty yellow. When a flame is coloured it imparts its colour to all the surfaces it falls on, and if the flame could be made a pure colour, without any white in it, all other colours are invisible in its light.

In these experiments ordinary air has been used to combine with the combustible materials, air being composed of four parts of nitrogen and one of oxygen. The nitrogen is quite inert, having no power to combine; in fact, it does nothing except to dilute the oxygen and reduce the temperature obtained. If we remove the nitrogen, and use oxygen alone, the combustion is far more rapid and intense; and I will now show you some of the wonderful effects which can be produced with ordinary coal gas and the compressed oxygen prepared by the Brin Oxygen Co. by a very simple and cheap process. The blowpipe I shall use is a very noisy one, but as it was only designed as a cheap arrangement for workshop emergencies, this is not a matter of great importance, as, by using a more expensive form of blowpipe and a slightly different gas arrangement, the apparatus can be made absolutely silent. I have here a plate of steel $\frac{1}{4}$ inch thick, which, when hardened and tempered, is absolutely drill proof, and I will now proceed to fuse a slot in it, which, as you see, can be done with the greatest ease at the rate of something like three inches per minute. I now take a heavy ordinary engineer's file, and a clear hole is fused through in less than a minute; and, using the same blowpipe, I will direct it on to a block of lime, and obtain a light which is strong enough to throw shadows of ordinary gas flames.

You will remember the heat obtained in the small furnace by the flameless combustion of air and gas. I will now take the same furnace and use the air deprived of its inert nitrogen. In the furnace is a crucible filled with scraps of steel; the crucible is one which will stand perfectly the fusion of pure wrought iron at a clear blinding white heat, and yet you will see that both crucible and steel are fused with the greatest ease.

You will no doubt observe that in the production of these enormously high temperatures a little flame is visible, but it is so trifling as to be of no importance; part of it being caused by the combustion of the dust in the air drawn towards the outer surface of the zone of combustion. If it were possible in practice to consume the mixture entirely without flame, the results would undoubtedly be still greater than you now see.

When speaking of the properties of flame I am on the borders of the unknown, and my experiments and knowledge of this subject are very incomplete. The study is to myself one of both business and pleasure combined, and I am still studying experimentally the cold zone or space which exists between all flames and cold substances to which they are applied. If this cold zone can be passed in practice, and the flames can be applied in direct contact with the vessels to be heated, we shall then obtain something approaching the full theoretical duty of the fuel consumed, and our waste of fuel will drop to a very small fraction. I have succeeded in obtaining this direct flame contact in certain forms of apparatus for boiling water by the addition of solid projecting studs to the surface of the vessel; these studs become sufficiently hot to admit of contact with the flame, and by a series of careful experiments I have come to the conclusion that the effective value of this surface is

about six times as great as that of surfaces with which water is in direct contact, *i.e.*, one square foot of surface on a projecting stud is equivalent in effective work to six square feet of ordinary boiler or water tube surface. In a paper which I had the honour of reading before the Iron and Steel Institute, I referred to one problem in heating which, if solved, would reduce our waste of fuel to zero, *i.e.*, the conversion of a large bulk of heat of low intensity to a smaller bulk of heat of high intensity. This conversion is possible with all other natural forces, such as light, electricity, &c., and I believe it to be possible with heat also, the only objection being, so far as I can see, that we do not know how to do it at present; but I have no doubt that the time will come when this problem will be solved by someone who will be rewarded by both fame and fortune.

Trade Notes.

THE TELEPHONE IN MANCHESTER.—We are glad to notice that there is a prospect of a great reduction in telephonic rates, which at present are so excessive as to greatly restrict the use of this feature of modern progress. Under the name of the Mutual Telephone Co., Limited, a company has been registered which proposes to provide shareholders and others within a radius of one mile from the Manchester Exchange, with an exchange wire at a cost of £5. and £6. per annum respectively. The "Mann" system of switching will be employed, and the wires be laid on the metallic circuit principle.

THE EXPORTATION OF SALT FROM THE MERSEY.—The exports of salt to foreign countries from Liverpool during April amounted to 59,537 tons, against 48,536 tons during April last year, an increase of 11,001 tons. The shipments during the first five or six months of last year were equal to the average of previous years, the quantity being assisted very much by the balances of contracts at cheap prices. As the total output for the first three months of this year exceeded the output of the same period of last year, the maintenance of the foreign exports at a good average must be very reassuring to those interested in the salt trade, and who believed our English production of the article would be taken as usual abroad at prices that must leave good profits to the producers.

CAVES containing deposits of earth with from 4 to 30 per cent. of calcium nitrate, and 5 to 60 per cent. of calcium phosphate, says the *American Druggist*, are common in Venezuela, not only in the littoral mountain chains, but also on the flanks of the Cordillera of the Andes. In these deposits are imbedded remains of mammalian bones, preserving their form, but so friable as to fall to powder when they are extracted. They consist solely of calcium phosphate; the gelatin has been nitrified and dissolved out, and the calcium carbonate of the bones has been used up in neutralising the nitric acid produced. The nitric ferment is found in abundance throughout the deposits in a very well developed form. Some of these deposits are ten metres thick.

METROPOLITAN WATER SUPPLY.—Dr. Frankland reports to the Registrar-General the results of the chemical analyses of the waters supplied to the inner, and portions of the outer, circle of the metropolis during the month of March. Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ended December, 1876, as unity, he finds that the proportional amount contained in an equal volume of water supplied by each of the metropolitan water companies, and by the Tottenham Local Board of Health, was:—Kent, 0.5; New River, 1.3; Colne Valley, 1.4; Tottenham, 1.7; Grand Junction, 2.1; Southwark and Lambeth, 2.4; East London, 2.6; West Middlesex, 2.9; and Chelsea, 3.5. The water drawn from the Thames by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies again exhibited a considerable reduction in the proportion of organic matter, the Grand Junction Company's water taking the lead in this respect. The water was in every case efficiently filtered. The water obtained chiefly from the River Lea by the New River and East London Companies showed a corresponding improvement as compared with the supply in February. It was efficiently filtered. The deep-well waters of the Kent and Colne Valley Companies and of the Tottenham Local Board of Health were, as usual, of a high degree of organic purity, but only the supply of the Kent Company excelled that of the New River Company in this respect. The Tottenham water was slightly turbid owing to suspended particles of rust of iron. The Kent and Colne Valley waters were clear and bright. That of the Colne Valley Company was softened before delivery, and was thus rendered suitable for washing. Seen through a stratum two feet deep, the waters presented the following appearances:—Kent, Colne Valley, and New River, clear and colourless; Tottenham slightly turbid and colourless; the remaining waters clear and very pale yellow.

* Corn Exchange, Oxford, April 25th, 1890. Lecture delivered by Thomas Fletcher, F.C.S.

MEETINGS OF COMPANIES.

N OIL COMPANY, LIMITED.—The report for the year 1899, states that the amount written off for depreciation is £5 per cent. upon the capital expenditure. The profit including £793. brought forward, is £42,250., and the board commend a dividend at the rate of 6 per cent on the ordinary shares, and one at the rate of 15 per cent. on the ordinary shares, in equal proportions on June 4th, and December 4th, less £4,000. The sum of £4,000. is also to be placed to the reserve will then amount to £27,467., £2,287. being carried forward.

TO COMPANY.—The ordinary general meeting was held on the presidency of Mr. H. M. Matheson. The Chairing the adoption of the report, said that after the experience, the board did not believe even if the prices were higher there could be for years to come any marked effect upon the market. On the other hand, with the new uses to which this metal was being applied, it might safely be said that the market was in a healthy condition. Their deliveries of pyrites; the market in England, Germany, and elsewhere under contracts for pyrites and copper, the former at fixed contract prices and the latter at the price of the month for delivering had amounted to 395,081 average copper contents had been 2.595 per cent. dry weight, 9,416 tons of copper. These figures were the highest obtained by the company. The copper made at the mines amounted to 17,667 tons, and they had brought to the market and realised 17,667 tons in all with the pyrites copper, 27,083 tons. The stocks of copper were large, but the great bulk was in the form of "matt" (copper pyrites), and there were also 890 tons of refined, all of which was carried over in the books at cost price. Owing to the unsuccessful sale of sulphate of copper in checking the ravages of the vine a large demand for this copper product has arisen, and the company had taken the means to profit by it. Mr. T. C. Bruce seconded the adoption of the report was carried.

AND BARRY, LIMITED.—The 12th annual general meeting of shareholders was held on Tuesday at the City Terminus Hotel, under the presidency of Mr. F. T. Barry, M.P. The Chairman stated that the accounts did not permit the payment of a higher dividend for the year than 6s. per share, after placing £21,000. to the reserve funds. Having alluded with satisfaction to the increase in the market value of copper, he stated that their liabilities, exclusive of the balance of profit for the year, £30,571. as compared with £50,034. at the end of 1888. A moderate reduction had been made in the valuation of the stocks at the mine, the valuation of the various stocks of ore and copper precipitate, after allowing for shipment per Cornelia, valued at stood at a lower figure than in the previous balance-sheet. The assets, after allowing for the difference between the balance at the end of 1889 and at the close of 1888, amounted to £100,000. more than at the 31st of December, 1888. As stated in the balance-sheet, one cash item embraced the sum of the payment of which they were still endeavouring to engage in legal proceedings. Turning to the profit and loss account, he stated that they had received payment of their claim for over-assessment of tax, alluded to by him at their two last annual meetings. He decided to carry forward £44,203. in consequence of the unsettled which he would presently more fully refer. The quantity of ore and raised at the mine during 1889 gave a total of 176,228 tons, a large reduction was made in consequence of the breakage of the current make of copper precipitate having been under consideration by the directors at a board meeting, held on the 11th of 1889, when the quotation for G.M.B. copper was under 10s. per ton. At the board meeting in question they approved the reduction of copper precipitate being reduced to the equivalent of fine copper, but as the price of copper improved during the latter year they took immediate steps for increasing the production. The actual make amounted to 4,592 tons of fine copper. For the year they estimated the quantity of ore broken and raised would be 300,000 tons. The annual average for the eight years, 1882-89, was 326,743 tons. Naturally, after the extraction of such a large quantity the present workings were at a much lower depth in the mine than in 1882, and the ore they were now breaking did not contain so high a percentage of copper as the ore broken and raised in the higher workings. The production of copper precipitate is estimated at 5,000 to 5,500 tons fine copper. At the 19th they had under treatment for the extraction of copper millions of tons of mineral, and the whole of their workings proved that there was ample ore in sight to continue the production. The legal proceedings they had been instituting against La Société Industrielle et Commerciale of Paris, and the Comptoir d'Escompte de Paris, for payment of the value of shipments of copper precipitate

delivered under the company's contract during January, February, and March, 1889, were still pending, but he hoped that their action against the Comptoir d'Escompte would come on for trial during next month. The amount of the Company's claim for copper precipitate delivered was £99,351., subject to a credit for resale of March delivery, amounting to £24,595., thus reducing their claim to £74,756. Their company ranked, of course, as creditors against the estate of La Société des Métaux in liquidation, but, in addition, they had secured, under an attachment order, a payment into Court of £9,486. They now awaited the decision of the Court of Queen's Bench as to whether this sum should be paid over to this company, or whether the official liquidator could claim it on behalf of the general creditors of La Société des Métaux. They had also a second attachment order running against copper, assumed to be the property of that company, in the hands of third parties. He thought the prospects of the copper market very satisfactory. The large accumulated stock of copper held at this date, last year by those who were associated in financing the French speculation was reported to have been reduced from 179,000 tons to about 89,000 tons, and should the consumption of copper continue upon the scale of the last six months, he thought they might reasonably expect that the present price of copper would gradually advance. The recent rise in the value of silver had also a direct tendency to strengthen the copper market by increasing the demand for copper in India, and by reducing the shipments of copper from Chili. He concluded by moving the adoption of the report and the payment of a final dividend of 4s. 2d. share, making 3 per cent. for the year. Mr. Francis Ricardo seconded the motion. In answer to questions, the Chairman expressed the hope, in regard to the question of dividend, that they might meet next year under more favourable auspices. It was, however, necessary to keep a large sum in hand pending the result of the litigation referred to. The motion was then adopted.

NOBEL-DYNAMITE TRUST COMPANY, LIMITED.—The following is the report by the directors for the past year:—Annexed are the accounts for the year ending 30th April, 1890: The net profit for the period, after payment of income tax, amounts to £142,306. 1s. 5d., and, including the sum of £10,153. 5s. 6d. brought forward from last account, there is a total available profit of £162,359. 6s. 11d., which the directors propose to be applied in the following manner, viz.:—In extinction of preliminary expenses, £4,500.; in payment of a dividend of 8½ per cent., free of income tax, on 160,397 shares, £136,337. 9s. 6d. carrying forward to next account, £11,521. 17s. 11d.—total, £152,359. 6s. 11d. The dividend on the remaining 15,000 new shares recently issued will be paid out of an amount received in special consideration for their admission to participation, as hereinafter explained. While in previous years the profits of the subsidiary companies, whose dividends constitute your revenues, had been almost exclusively derived from the production and sale of blasting agents, and were consequently nearly entirely dependent on this one source of income, your directors have now to report a series of occurrences which have effected a considerable change in this respect, enlarging the sphere of your interests, and placing them upon a materially broadened basis. Nitro-glycerine compounds, although pre-eminent among explosives as blasting agents for mining purposes, had not hitherto been found capable of satisfactory employment as propelling agents for military purposes. The difficulties in the way of rendering them adapted for such purposes were very great, and were of a description to make the very highest demands upon the skill of the inventor. It must, under these circumstances, be regarded as an event of the first importance, that your honorary president, Mr. Alfred Nobel, has been enabled to announce the invention of military powders on a nitro-glycerine basis, the practical manufacture of which on a large scale has since been perfected by our subsidiary companies. The directors were enabled, and it at once became their duty, to secure for the subsidiary companies the benefits of this new invention, so far as regards its employment in the United Kingdom, the British Colonies, the German and Austrian Empires, and certain other countries. An arrangement with this object has accordingly been made with Mr. Nobel on the basis of pre-existing general arrangements, and on terms considered by the directors to be equitable and fair. The new invention as perfected may now confidently be asserted to fulfil the highest ballistic requirements of a smokeless powder. Concurrently with this acquisition, through which the sphere of the company's interests was extended by the inclusion of military powders among the products to be manufactured by the subsidiary companies, a somewhat analogous process of development was in operation in the business of the leading Continental powder manufacturers, tending to bring them into keen competition, not only with your prospective interests in the powder trade, but also in connection with the production of high explosives generally. The manufacturers more particularly referred to are the United Rhenish-Westphalian Powder Factories, of Cologne, and the Rottweil-Hamburg Powder Factory, of Rottweil, acting in combination with Messrs. Cramer and Bucholz, of Ronsahl, and Messrs. Wolff and Co., of Walsrode. This group had long occupied a position of exceptional eminence at the head of their trade as the

manufacturers of the well-known cocoa and other powders, and were at this time themselves commencing the production of chemical smokeless powders. The directors must ascribe it chiefly to the efforts of their colleagues, Mr. Max A. Philipp and Mr. J. N. Hiedemann (whose exertions were attended with the special advantage due to his exceptional connection with both parties), that it has been possible to arrive at an understanding with these powder factories, whereby a complete identity of interests is secured for the future between the two groups. The new agreement provides that for a period of about 35 years ending 31st December, 1925, the profits of the two groups are to be pooled and re-apportioned in certain fixed percentages, which have been determined with due regard to the previous revenues and present prospects of the respective groups. The entire arrangement has been the subject of very anxious and careful consideration at the hands of your directors, and they feel satisfied that it will be found to operate to the advantage of both parties. Irrespective of the avoidance of a mutually injurious competition, the new combination may be confidently expected to secure that which the shareholders will doubtless join with the directors in regarding as of the highest importance, viz., a greater immunity to both parties from irregularity of annual results, whether arising from fluctuations of trade or from the uneven incidence of the risks of explosion. It also offers every probability of enabling considerable economies to be effected, both in manufacturing costs and capital outlay, it being now possible for both groups to arrange to produce at a common source various materials, which would otherwise have had to be separately manufactured by each. It remains to be added that the agreement with the Powder Group came into operation as from 1st July last. In January of this year a new issue of 15,000 shares was made to provide funds for the purchase by the Dynamit Actien Gesellschaft, of Hamburg, of a controlling interest in the important Chemical Company, the "Chemische-Fabrik-in-Billwärder-vorm-Hell-and-Sthamer, A. G.," and for the anticipated requirements of the subsidiary companies in connection with the erection of works for the manufacture of smokeless powders, and for other purposes. Of these shares 5,900 were issued for cash, and the remaining 9,100 were allotted in conversion of a new issue, made with the sanction of the board, of M1,000,000 (about £50,000) of shares in the Dynamit Actien Gesellschaft. The sum of M2,000,000 (about £100,000) was applied by that company out of the proceeds of these shares in purchase of the interest in the Chemische-Fabrik-in-Billwärder, consisting likewise of M2,000,000 in shares. This investment has been made in concurrence with the Powder Group for the promotion of the common interest, and is confidently anticipated to yield a satisfactory rate of profit. The balance of the proceeds of the new capital of the Dynamit Actien Gesellschaft, as well as of the 5,900 shares issued for cash, is intended for the other purposes above referred to. Both the 5,900 shares allotted for cash and the 9,100 shares issued in conversion of the new capital of the Dynamit Actien Gesellschaft were disposed of at a premium of £5. per share. The total premiums on the new issues will be treated as reserves, the amount accruing to this company being £29,500., as shown in the balance-sheet, while the addition to the reserves of the Dynamit Actien Gesellschaft from this source amounts to £45,500. In addition to the premium which has been mentioned, a special payment of £1. per share was received in express consideration for the admission of the new shares to participation in the forthcoming dividend, the proceeds of these shares not having been available for contribution to revenue during the past year. Of this amount £12,750. has been carried to profit and loss, being the equivalent of the proposed dividend of 8½ per cent., the remaining £2,250. being dealt with as premium. The general business of the past year in the dynamite branch, although subject to some fluctuations, may on the whole be characterised as satisfactory. The business of the Powder Group has temporarily been adversely affected owing to its state of transition from the old products to the new smokeless powders. From this cause, one of the principal powder factories was for several months lying idle, during extensive alterations, but work has now been actively resumed on an increased scale. The directors regret to announce the resignation during the past year of their colleague, Mr. John Taylor, occasioned by the pressure of other engagements upon his time and attention. The vacancy thus created at the board has been filled by the appointment of the Right Hon. Lord Ribblesdale. Lord Ribblesdale, Mr. Philipp, and Mr. Reid, are the directors retiring at the forthcoming general meeting, and, being eligible, are cordially recommended for re-election, as are also Messrs. Cooper Brothers and Co., for the office of auditors to the company.

SHIPBUILDING on the Tyne is now becoming less brisk. From the Walker yard of Sir W. G. Armstrong, Mitchell, and Co., hands are being paid off. This firm have now on the stocks three petroleum steamers unsold. Large numbers of workmen are also being discharged from the Hebburn yard of Messrs. Hawthorn, Leslie, and Co.

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds. **ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.**—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Plant generally.

BLACKMAN VENTILATING CO., LONDON.—Fans, Air Prope Ventilating Machinery.

G. G. BLACKWELL AND CO., LIVERPOOL.—Manganese Ores, Bau French Chalk. Importers of minerals of every description.

BRACHER AND CO., WINCANTON.—Automatic Stills, and P Mixing Machinery for Dry Paints, Powders, &c.

BRUNNER, MOND AND CO., NORTHWICH.—Bicarbonate of Soda Ash, Soda Crystals, Murate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.

BUCKLEY BRICK AND TILE CO., BUCKLEY.—Fireclay ware of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.

CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Driers, Steam Traps (McDougall's Patent).

W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.

CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Benzole, Toluole, Xylol, and Nitro-compounds of all kinds.

J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.

R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Works, Blowing Engines, Filter Presses, Sludge Pumps, &c.

DAVIS BROS., MANCHESTER.—Samples of Products from various chemical processes—Coal Distilling, Evaporation of Paper, Treatment of waste liquors from mills, &c.

R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Plant, Holders, Condensers, Purifiers, &c.

DOULTON AND CO., LAMBETH.—Specimens of Chemical Stoneware Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.

E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Oxygen Bleached Esparto-Pulp, Ozonised Oil, Ozone-Ammonia Lime, &c.

GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.

GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Speciality, India-rubber Chemicals.

JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters. **JOSEPH KERSHAW AND CO., HOLLINWOOD.**—Soaps, Greases, Varnishes of various kinds to suit all requirements.

C. R. LINDSEY AND CO., CLAYTON. Lead Salts (Acetate, Nitrate, &c.) Sulphate of Copper, etc.

CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Car Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants.

MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours. Samples of Dyed Goods and Miscellaneous Chemicals, organic and inorganic.

MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhausting Boiling Jets, Air Compressors, and Acid Lifters.

E. D. MILNES and BROTHER, BURY.—Dyewoods and Dye Extracts. Also samples of dyed fabrics.

MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Models of all kinds of heating appliances.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, covered Sulphur, etc.

ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings, illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent valves.

J. ROYLE, MANCHESTER.—Steam Reducing Valves.

A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitutes, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, Disinfecting Fluids.

WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pump Machinery. Speciality, their "Duplex" Pump.

JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-Heater. Makers also of Multiple Effect Stills, and Water softening Apparatus.

Correspondence.

ANSWERS TO CORRESPONDENTS.

W.V.C.—Sorry to have overlooked your enquiry. You will find the information you require in *Electrolysis*—by Fontaine and Berly—published by Messrs. E. and F. N. Spon, London.

J. A. W.—We insert your query below.

K. P.—Wait a little while. We shall have more to tell you soon.

R. D.—Yes. The cost sheet may look well now, but what is to happen if you increase production as you propose doing.

DELTA.—An advertisement in this issue gives what you want.

QUERY.—Has the Emulsene (for raising liquids as described by Mactear Journal Soc. Chemical Industry, vol. 6, 1887), met with any success in Great Britain, and would not the air, liberated at the delivery pipe carry away considerable quantities of acid fumes (in the case of raising strong hydrochloric acids), unless provided with some small washing arrangement?—J. A. W.

* * We do not hold ourselves responsible for the opinions expressed by our correspondents.

To the Editor of the Chemical Trade Journal.

SIR,—I notice in your issue of March 1st, 1890, a letter on the determination of "moisture in wood pulp," and beg to say that a number of years' extensive experience in England, America, and Continental Europe has taught me that the air-dried basis is most unsatisfactory to both manufacturer and consumer, and last—but by no means least—to the dealer or importer. I thoroughly agree with Mr. John Pattinson's remarks and claims that selling and buying on "dry weight in water jacketed oven" (as a contract I recently heard read), would avoid much trouble with all pulps.

Further, the method of calculation adopted ought to be more definitely established between seller and buyer, and specified in the contracts.

As the matter now stands, and with existing trade customs, there is far less trouble in the pulp trade from anything connected with the tests than there is from the fact that the average book-keeper in a paper mill is often "way off" in his method of calculation.—Yours respectfully,

H. A. RADEMACHER, C.E.

Bridgeport, Conn., U.S.A.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

CHEMICAL SOCIETY.

EXHIBITION OF APPARATUS.

THE Chemical Society made a somewhat new departure on the 8th inst., in the form of an exhibition of novel and interesting apparatus that had been evolved by individual Fellows to meet the requirements of their work. The credit of this innovation must, we believe, largely rest with the President, Dr. Russell, who is desirous of signalling his presidency by several improvements in the established routine of the society. The result was certainly most encouraging. From the Council room to the library exhibits were well arranged and attended, and attracted a goodly company. Besides the faces familiar to all who frequent such gatherings, were many visitors as well as Fellows less often seen than some at Burlington House, and so great was the tax upon the available air-supply, that the rooms, never remarkable for their ventilation, reached a condition bordering on asphyxiating. Decorously going the round, and taking the official list as our guide, we started on the ground floor in the Council room and inspected the interesting exhibit shown by Mr. A. W. Stokes, which included an air-bath on the approved principle recently laid down by Mr. Adams, of paper coil renown, and recorded by him at length in a recent number of the *Analyst*, and a useful device for capping iron tubes for combustions, consisting of a gun-metal nut carrying a small tube suitable for rubber connections, which screwed on to the end of the iron tube, the joint being made good by a lead washer pressed against the faced end of the latter. Close by was the spark coil of Messrs. Pyke and Barnett, which has lately made such a stir in electrical circles, and directly opposite, the apparatus used by Prof. Thorp and Mr. Tutton for the preparation of phosphorous oxide, which, it will be remembered, they recently showed to have the formula P_4O_6 , double that formerly accepted.

On the first floor in the room in which the ordinary meetings of the society are held, Prof. Ramsay showed an ingenious adaptation in the case of the balance, of the now familiar principle of exhibiting small deflections to an audience by means of a spot of light thrown by a mirror on to a scale. Changes of weight as great as 1.5 grms. were provided for by the scale, the least readable deflection of which corresponded to a delicacy of .01 gm. Prof. Armstrong showed various laboratory fittings in use at the Central Institution, and Mr. Lemox had on view a compact gas analysis apparatus, the merits of which were fairly proved by the service it had evidently seen. In the preparation room adjoining Mr. Shenstone had a blowpipe table and two blowpipes designed for working lead glass, which were quite difficult to approach on account of the crowd round them. Mr. Shenstone is, as is well known, an expert glass-blower, and preferring lead glass as making sounder and safer joints than the German variety, has met the difficulty of its tendency to blacken by greatly enlarging the air supply to the blowpipe, and thus getting an oxidising flame, with which no such risk exists. Among other things he showed several forms of mercury joints, and, in conjunction with Professor Tilden, the platinum apparatus used in determining the solubility of salts at high temperatures, which was described some time since in the journal of the Chemical Society. Close at hand were the elaborate apparatus used by Sir Henry Roscoe and Mr. Lunt for the determination of dissolved gases in water, and for the determination of oxygen by the Schützenberg process improved by the exhibitors. The general tendency to use stop-cocks, guarded by mercury cups from access of air, in the various apparatus for the manipulation of gases, amply proves the utility of this method, first devised by Mr. Arnold Eilvart, formerly of King's College, London, and, we believe, patented by him.

Professor Dunstan showed an arrangement for obtaining pure mercury by distillation, consisting essentially of a bulb (heated by a ring burner) supplied by the mercury to be purified at its lower part, and provided with an exit tube at the top, which was bent over and of such a length as to cause the distillation to proceed in a Torricellian vacuum. During distillation each drop of mercury as it condenses gives rise to a distinct flash of light, easily visible in a darkened room. Upstairs in the library were some of the best exhibits of all. On entering, one was at once attracted by a magnificent collection of coal tar products and colouring matters, including a number of derivatives of the new "Primuline series," shown by Messrs. Brooke, Simpson, and Spiller. On the wall was a fine collection of photographic enlargements of the plants and their roots grown in experiments on the fixation of free nitrogen, exhibited by Dr. Gilbert. Dr. H. G. Colman showed several tetrahedra models, and Dr. Sheridan Lea a porcelain vacuum funnel, consisting of an ordinary porcelain funnel, on a ledge near the top of which rested a perforated porcelain plate bearing a disc of platinum gauze; on this was laid a rubber ring, and a cylinder of porcelain open at both ends was held down on it by screw clamps gripping it and the funnel proper. By this arrangement the filtering medium, e.g., an ordinary disc of paper, could be laid on the gauze,

clipped by the rubber ring, the joint made good by the clamps, and filtration effected through a plane surface instead of the usual cone. Professor McLeod showed a diagram of his apparatus for evaporation, and the drying of solids in vacuo, which he has proposed as possibly adapted for the method of water analysis of Frankland and Armstrong. Dr. Plympton had two excellent exhibits: (1) An apparatus for estimating sulphur and the halogens in organic compounds, the principle of which is the same as that employed in determining sulphur in coal-gas; a small flame of coal gas (or hydrogen in the case of sulphur determinations) burns under a lamp chimney in a brisk current of air aspirated by a water pump, and into it is pushed a little platinum basket containing the substance to be analysed, the products of combustion being caught in a tower filled with glass beads moistened with caustic soda. In the case of a volatile liquid, the gas is simply passed through it and burnt along with the vapour it takes up. (2) A set of Gooch crucibles and some modifications of his devising.

Dr. Norman Collie showed several clever contrivances useful to those making many combustions, notably a tube for collecting the water, which, externally resembling an ordinary U tube, contained in the near limb a little tube receptacle to catch the bulk of the water and to allow the rated passage of the gas to be seen, and a drying tube of pumice soaked in sulphuric acid which could be renewed without disconnection. Mr. S. U. Pickering showed the apparatus used in his researches on the nature of solution, much of which had a value besides that given it by its scientific merits, which roused covetous feelings, excusable when the almost fabulous price which platinum has now reached is considered.

That the exhibition was a complete success there can be no doubt, and its repetition may well be effected after a reasonable interval.

THE LEAD-POISONING QUESTION AT SHEFFIELD.—In accordance with the recommendation which followed the investigation last February, by a Special Committee of the Sheffield Corporation, on the prevalence of lead-poisoning in the borough and surrounding district, "a small but sufficient quantity of chalk in a state of minute division" is being added to the Redmires water before its distribution to the town, by way of experiment. Mr. E. M. Eaton, Assoc. M. Inst. C.E., the engineer of the water department, first made experiments with the water in the Hadfield dam, at Crookes, but, experiencing a difficulty in securing a good mixture, he turned his attention to Redmires; and for the last month or so, it is stated, there has been an uninterrupted addition of chalk to the water, and that in a way which secures a perfect admixture. The culvert through which the water flows into the town commences in a little wood by the side of the third or lowest dam at Redmires. As the water leaves the dam, it runs into a miniature reservoir, and then falls into the culvert some feet below. It is here that the chalk is applied. The means adopted are both simple and inexpensive. In a shed close to the culvert there is a large cask constantly supplied with water, into which is put a prescribed quantity of chalk at stated intervals. A churn-like apparatus fixed into the cask secures the perfect mixture of the chalk with the water. A lead pipe runs from the cask to the head of the culvert, and from it there drops into the water, just as it is tumbling into the culvert, a continuous supply of milk or cream of chalk. The water, of course, becomes instantly coloured; but it is said that by the time it reaches Sandgate, it is as clear as it was before it entered the conduit. That this plan secures a thorough admixture of the chalk with the water there can be no question; and a further advantage connected with it is, that the supply of one to the other can be regulated by turning a tap at the head of the pipe. The tests, of course, have not been carried on sufficiently long to warrant the statement that a perfect remedy has been found, but Mr. Eaton is said to be satisfied with the results which he has obtained so far.

Market Reports.

REPORT ON MANURE MATERIAL.

There has been a fair business passing during the week for immediate delivery, but, as we approach the end of the spring season, the orders are becoming more retail in their character, buyers being unwilling to saddle themselves with anything they may be obliged to hold over the current season. Prices on the whole, both for phosphatic and nitrogenous material remain without much alteration, but perhaps a shade in favour of buyers.

The situation as regards Charleston phosphate rock continues without much alteration, outside sellers still inviting bids of 10d. per unit for cargoes of river rock c.i.f. to United Kingdom, and buyers being in no hurry to make their purchases for next season, having still hopes of being able to do better by waiting. Quotations for Canadian and high class Somme remain without alteration, but they do not admit of business, and sellers will have to modify their ideas before they can expect to attract United Kingdom orders. There is nothing special to note in

Belgium phosphates, and as regards Florida, the results of experiments of trial shipments are awaited before buyers can entertain large purchases of this description of rock.

We do not hear of any transactions in River Plate cargoes of bones and as yet it seems too early to determine how the market is likely to rule for next season, the American demand for shipment up to the end of the year which may be expected having so far not made its appearance. We do not hear of any fresh business in bone ash, but the market is very firm. Sales of East India bone meal have been made at £5. 10s. ex quay and ex store, Liverpool, and £5. 10s. is closing value on spot. For shipment ahead £5. 5s. would no doubt be business, and in some cases buyers are invited to bid as low as £5., but we doubt whether the latter price would be business. The market has been cleared of crushed East Indian bones on spot, but business is doing for shipment ahead at very full prices, and sellers do not seem inclined to commit themselves to any very large sales as they did last year to their cost. Nitrate of soda is a shade easier on the week, spot value being 8s. per cwt. for ordinary up to 8s. 1½d. for refined. Du cargoes are worth scarcely 8s. per cwt., and for shipment ahead they would be sellers at 8s. 4½d., June-July shipment, and at 8s. 8½d. for September-October-November.

The market for dried blood remains firm at 10s. 6d. to 11s. per unit for home prepared, delivered free to rails at works. There is no River Plate offering at the moment.

Superphosphates are getting scarce, and 47s. 6d., net cash, in bulk f.o.r. at works, now lowest, 50s. being asked in some instances.

METAL MARKET REPORT.

	Last week.		This week
Iron	44/5	....	44/6
Tin	£92 0 0	....	£93 5 0
Copper	49 13 9	....	52 5 0
Spelter	21 5 0	....	23 0 0
Lead	12 17 6	....	12 17 6
Silver	46d.	....	47½d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	17½ 17½	....	18½ 18½
Mason & Barry	6½ 6½	....	7½ 7½
Tharsis	4½ 5½	....	5½ 5½
Cape Copper Co. ..	3½ 4	....	4½ 4½
Namaqua	2½ 2½	....	2½ 3
Copapo	2½ 2½	....	2½ 2½
Panulcillo	1 1½	....	1 1½
New Quebrada	½ ¾	....	¾ ¾
Libiola	2½ 2½	....	2½ 2½
Tocopilla	1/- 1/6	....	1/- 1/6
Argentella	3d. 9d.	....	3d. 9d.

MISCELLANEOUS CHEMICAL MARKET.

There has been a further decline in value of caustic soda during the past week, 70% having been done at £8. 5s. per ton. Other strengths are lower in a corresponding degree; 77% f.o.b. Tyne, £9. 15s. to £10. 7½ f.o.b. Liverpool at £9. per ton. Values all round are now within 5s. to 7s. 6d. per ton of the lowest points touched at the end of January last, and prior to the strong and sudden advances which commence from that time. With soda ash at 1½d. per deg., we now have the anomaly of caustic soda at a lower price, viz. 1½d. per deg.; certain grades of soda ash are, however, distinctly lower in value and can be got from 1½ per deg. Bleaching powder quiet and unchanged in value at £5. per ton on rails. Soda crystals, £2. 17s. 6d. per ton. Vitriol more plentiful, and rather lower in price. Muriatic acid without change. Sulphate of copper is firmer in sympathy with the copper market, and spot prices are £25. to £26. per ton. Lime £23. 10s. to £24. Lead salts are firmly maintained in prices, and white acetate reported firmer in some quarters, but no general advance has been established. White lead, nitrate of lead, litharge, etc., have all rather a higher tendency. Firmness in the metal markets has also influenced salts of tin, zinc, copper, and silver. Acetates of lime are in about the same position as last reported, and prices nominally the same. There is, however, only a small amount of business passing in these or other acetates or acetic acids. For oxalic acid there has been considerable enquiry, speculative and resale transactions being recorded at 3½d. to 4d. per lb. Tartaric and citric acids are without quotable change. Potash prussiate and bichromate are quiet. Potas carbonate and caustic firm, and fair amount of business being done at current rates, both for early and forward deliveries. Carbolic crystals still declining in value, and quotations somewhat irregular—at 7½d. to 8½d. for 34° (in quantity). Other miscellaneous goods without special change in position, and trade generally is reported quiet in most branches of chemical manufacture.

TAR AND AMMONIA PRODUCTS.

are quoted 3s. 9d. and 2s. 9d. for 90's and 50/90's but the prices are merely nominal and there is so little of their continuance that forward contracts could probably be easier terms. The heavy demand for solvent naphtha is ices stand fairly firm at 1s. 8d. to 1s. 9d.. Creosote to 2½d. according to quality, while the crude carbolic is settled and irregular, buyers offering 2s., and sellers ss than 2s. 2d. Anthracene and pitch are in practically station as last week.

of ammonia has improved considerably since last week. es have been accorded at all the ports; and the present aims reassuring. At Beckton the quotation has risen to l.—£11. 15s., but no business is recorded at these prices. don makes may be taken as £11. 8s. 9d., and £11. 7s. 6d. or Leith.

LIVERPOOL MINERAL MARKET.

on the whole have ruled steadier during the past week. Arrivals small; prices firm but unaltered. Magnesite: ivalers have taken place, and prices for raw lump are in buyers. Rav ground, £6. 10s.; and calcined ground, l. Bauxite (Irish Hill brand) continues in exceptionally and, bringing full prices—Lump, 20s.; seconds, 16s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. alk firm at last quotations, especially G.G.B. "Angel-ind—95s. to 100s. medium, 105s. to 110s. superfine. (bonate), easy; selected crystal lump scarce at £6.; ps, 90s.; best, 80s.; seconds and good nuts, 70s.; ; best ground, £6.; and selected crystal ground, £8. s somewhat improved, best lump, 35s. 6d.; good medium, m, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. nicestone quiet; ground at £10., and specially selected t quality, £13. Iron ore steady. Bilbao and Santan-ros 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland in nd at 18s. to 24s. Purple ore as last quoted. Spanish us ore continues in fair demand. Emery-stone: Best scarce, and inquired for at full prices. No 1 lump at £5. 10s. to £6., and smalls £5. to £5. 10s. th steady; 45s. to 50s. for best blue and yellow; able ground, £7. Scheelite, wolfram, tungstate of soda, metal further inquired for. Chrome metal, 5s. 6d. per lb. loys 2s. per lb. Chrome ore: steadier, prices un- timony ore and metal have further advanced. Uranium to 26s. Asbestos scarce, bringing increased prices. ore firm; smalls, £14. to £15.; selected lump, £16. to ne: Best qualities scarce—60s. to 80s. Strontia steady; estine) steady, 16s. 6d. to 17s. Carbonate (native), £15. wdered (manufactured), £11. to £12. Limespar: English d, old G.G.B. brand in demand, and brings full prices; nd English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. emand, firm at 22s. to 25s. Plumbago steady; Spanish, eylon lump at last quotations; Italian and Bohemian, £4. ton; founders, £5. to £6.; Blackwell's "Mineraline," ch sand, in cargoes, continues scarce on spot—20s. Ferro-manganese and silicon spiegel in good demand figures. Chrome iron, 20 per cent., £24. to £25. t, £50. China clay freely offering—common, 18s. 6d.; m 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

al market in this quarter has further lost in tone since the st week, and caustic soda, at that time giving what were ns of recovery, has gone back again, and to-day is obtain- money in all the strengths, and yet not very much doing. owder also is easier, and the other market chemicals ie to the fall, with the exception, perhaps, of sulphate of Sulphate took a change for the better towards the close of id to-day it is very firm, especially for forward delivery, ally declining to name any prices on this basis at present. are plentiful at recovery up to £11. 5s., but sellers are ; this, and a further rise is probable. Deliveries of bichro- ported as mending slightly, but inaction is still the pre- ure. Paraffins unchanged on the market, but makers are ened with trouble on the part of the miners. The

announcement in the Scotch morning papers of the new Davis dis- coveries, threatening to revolutionise the alkali manufacture, and particularly the chlorine department, has been received with much interest in chemical circles, and developments are watched for. Chief prices current are:—Soda crystals, 50s. 6d. net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 5% Tyne; caustic soda, white, 76°, £10., 70/72°, £8. 10s., 60/62° £7. 15s., and cream, 60/62° £7. 10s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined alkali 48/52°, 1¼d., net Tyne; saltcake, 25s. to 26s.; bleaching powder, £5. 5s. to £5. 7s. 6d. less 5% f.o.r. Glasgow; bichro- mate of potash, 4d., and of soda 3d., less 5% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. 1½d. to 8s. 3d.; sulphate of ammonia, spot, £11. 5s. to £11. 6s. 3d. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% anyport; sulphate of copper, £24. 10s., less 5% Liver- pool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¼d. to 7d. on rails Glasgow to all Scotch buyers (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 15s. to £8. Week's imports of sugar at Greenock were 25,549 bags.

THE LIVERPOOL COLOUR MARKET.

COLOURS are unaltered. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE TYNE CHEMICAL REPORT.

TUESDAY.

The state of the chemical market is much about the same as reported last week. Business keeps quiet, but there is no material alteration in prices except for caustic soda, which is 10s. per ton under last quotation. This reduction makes a total decrease in price of £3. 10s. per ton during the last month. Bleaching powder is steady at last week's rates, with a little more enquiry for prompt shipment. Soda crystals are well sustained, and prices are stiffening. Soda ash has fallen off by one and a half per cent., and sulphate of soda quiet and easier in price by 1s. 6d. per ton. The production of caustic soda on an extensive scale by a new process will shortly be commenced on Tyneside. The Wallsend Chemical Company, Wallsend, who gave up balling their sulphate about three years ago, and disposed of it to the Jarrow Chemical Co., Tyne Dock, have recommenced the manufacture of soda ash and crystals. The market prices current are:—Bleaching powder, in softwood casks, £5. to £5. 2s. 6d. per ton; caustic soda, 77%, in drums, £9. 10s. per ton, ground in 3-4 cwt. barrels, £13. per ton; soda ash, 48/52°, 1¼d. per degree less 5½%; soda crystals, in 1 cwt. bags, net weight, £2. 14s. per ton, in 2 cwt. bags, net weight, £2. 11s. 6d. per ton; in casks, gross weight, £2. 11s. 6d. per ton; sulphate of soda, in bulk, 32s. per ton; ground and packed in casks, 42s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4½d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, in 1 cwt. kegs, £5. 15s. per ton, in 5-7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

Small coals for manufacturing purposes are slightly easier in price, owing to the lessened demand, and consequently more coal being thrown on the market. Durham small quoted 9s. 6d. to 10s. per ton, and Northumberland small, 8s. to 8s. 6d. per ton.

At the adjourned meeting of the Durham coalowners and the miners' representatives held on Friday last, the coalowners adopted the following resolution:—"After considering the request of the Federation Board for a further advance in wages, we are not prepared at present to give any advance, but in a month's time the tendency of trade may be made more clear, and we will then meet and discuss the matter further with the Federation Board."

Gazette Notices.

THE BANKRUPTCY ACT, 1883. Partnerships Dissolved.

HOWLETT BROS., Hanley, brick and tile manufacturers.
G. W. HAWKSLEY, J. WILD, and D. HAIGH, under the style of G. W. Hawksley and Co., or Hawksley, Wild and Co., Sheffield, boiler manufacturers, also under the style of the Belle Isle Dye Works Company, Wakefield, dyers.
WATKINS and SOULBY, St. Helens, oil and colour manufacturers.

New Companies.

BANNER, SON AND COMPANY, LIMITED.—This company was registered on the 2nd inst., with a capital of £1,000, in £1. shares, to carry on in Liverpool and elsewhere the business of chemists, druggists, &c. Registered office, 179, London-road, Liverpool.

KETLEY BRICK COMPANY, LIMITED.—This company was registered on the 3rd inst., with a capital of £10,000, in £10. shares, to carry on business as brick and tile makers. The subscribers are:—

	Shares.
J. Hassal, Ashbo de la Zouch, earthenware manufacturer.....	1
W. Hassall, Woodville, earthenware manufacturer	1
E. Ison, Ashby de la Zouch, metal trade valuer.....	1
G. Williams, Sheffield, brass founder	1
W. T. Skelding, Sloughbridge, brick manufacturer	1
T. Spencer, Bradford, contractor	1
C. Skelding, Sloughbridge, brick manufacturer	1
J. Jordan, Wollaston, Sloughbridge, solicitor	1
E. Webster, Harborne, brickworks manager	1

MASON'S PAPER MILL COMPANY, LIMITED.—This company was registered on the 7th inst., with a capital of £25,000, in £10. shares, to carry on the business of paper manufacturers, and for such purposes to acquire the leasehold ground known as Tovell's Wharf, situate in the Parish of St. Peter, Ipswich, and to enter into an agreement with Frank Wm. Mason. The subscribers are:—

	Shares.
G. C. Mason, Ipswich, merchant	1
F. W. Mason, St. Nicholas, Ipswich, merchant.....	1
H. W. Mason, Ipswich, merchant	1
G. Mason, Ipswich	1
Rev. S. W. Stagg, Colchester.....	1
Miss G. E. Mason, Ipswich.....	1
Miss C. M. G. Mason, Ipswich	1

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Manufacture of Chlorine. G. E. Davis and A. R. Davis. 6,416. April 28.
Mechanical Stoker.—(Complete Specification). C. Tschoepe. 6,424. April 28.
Chemical Furnaces. G. E. Davis and A. R. Davis. 6,433. April 28.
Smelting. H. Napier and T. Carr. 6,462. April 28.
Preparation of Oxygen.—(Complete Specification). E. Neave. 6,463. April 28.
Distillation of Hydro-carbons and other Oils. C. M. Pielsticker. 6,465. April 28.
Distillation of Hydro-carbons and other Oils. C. M. Pielsticker. 6,466. April 28.
Electric Batteries. H. T. Eagar and R. P. Milburn. 6,476. April 28.
Preventing Incrustation in Boilers.—(Complete Specification). J. Efrein. 6,478. April 28.
Evaporating Pans. G. Fletcher. 6,484. April 28.
Nitrated Colouring Matters. J. Inray. 6,486. April 28.

Low Water Alarm for Steel Boilers.—(Complete Specification). O. Imr. 6,489. April 28.
Electric Refrigeration.—(Complete Specification). M. W. Dewey. 6,491. April 28.
Feed-Water Heaters.—(Complete Specification). W. P. Thompson. 6,492. April 28.
Apparatus for Burning Hydro-carbon Oil. H. H. Lake. 6,502. April 28.
Dyeing. W. H. Booth. 6,506. April 28.
Electro Deposition. W. Ryland. 6,524. April 29.
Hardening Steel.—(Complete Specification). J. H. Bramwell. 6,529. April 29.
Reversing Valves for Gas Furnaces. S. Fox and T. Williamson. 6,531. April 29.
Production of Hydrochloric Acid and Ammonia. J. Plummer, jun. 6,532. April 29.
Preparation of Oxygen.—(Complete Specification). A. Longsdon. 6,533. April 29.
Insulating and Fire-proofing Material. G. Brewer. 6,555. April 29.
Electrical Measuring Instrument.—(Complete Specification). H. H. Lake. 6,568. April 29.
Electrical Measuring Instrument.—(Complete Specification). H. H. Lake. 6,569. April 29.
Pressure Gauges.—(Complete Specification). J. Jackson. 6,573. April 29.
Manufacture of Gas. J. H. W. Stringfellow. 6,575. April 29.
Dessicating Apparatus.—(Complete Specification). W. P. Thompson. 6,581. April 29.
Repairing Carbon Filaments of Electric Lamps.—(Complete Specification). H. H. Lake. 6,581. April 29.
Gas Producers.—(Complete Specification). J. J. Shedlock and T. Den. 6,584. April 29.
Distillation and Rectification of Alcohol.—(Complete Specification). W. Whiteman. 6,587. April 29.
Bleaching. R. T. Webb, care of The Ards Weaving Co., Limited, Newtownna. Down. 6,612. April 30.
Manufacture of Perfumes from Hydro-carbons. F. Valentiner. 6,613. April 30.
Electrical Switches. J. Warden and G. Smith. 6,623. April 30.
Steam Boiler Feeding, Regulating, and Indicating Apparatus. Murrie. 6,625. April 30.
Treatment of Paper-making Fibre Materials. J. Johnston and G. Johnst. 6,644. April 30.
Manufacture of Iron and Steel. J. H. Lancaster and M. R. Cowley. 6,645. April 30.
Furnaces for Destroying Organic Matter. M. M. Brophy, of the firm J. Slater and Co., 4, South-street, Finsbury, London. 6,660. April 30.
Electric Meter. A. Frager. 6,667. April 30.
Deposition of Alloys. S. O. Cowper-Coles. 6,670. April 30.
Smoke Prevention. T. Thornley. 6,692. May 1.
Manufacture of Chlorine. G. E. Davis and A. R. Davis. 6,698. May 1.
Wool Scouring. C. W. Kimmins and T. Craig. 6,706. May 1.
Marine Cement. F. C. Goodall. 6,711. May 1.
Steam Boiler and other Furnaces. H. C. Ashlin. 6,718. May 1.
Drying Kilns. J. Kirkby. 6,722. May 1.
Colouring Matters. C. Dreyfus. 6,729. May 1.
Production of Coloured Rubber Goods. C. Dreyfus. 6,730. May 1.
Generation of Carbonic Acid. J. McEwen. 6,758. May 2.
Secondary Batteries. H. Edmunds. 6,795. May 2.
Illuminating or Heating Gas.—(Complete Specification). W. C. Andre. 6,800. May 2.
Purification of Illuminating Gas.—(Complete Specification). W. C. Andre. 6,804. May 2.
Manufacture of Copper. Sir H. H. Vivian. 6,821. May 2.
Preparation of Chlorine. G. E. Davis and A. R. Davis. 6,831. May 3.
Treatment of Soap Makers' Leys. J. Taylor. 6,834. May 3.
Steam Boiler Furnaces. A. Sharratt. 6,842. May 3.
White Pigment. E. Parry and H. Foskett. 6,850. May 3.
Refrigerating, Evaporating, and Dessicating Apparatus. A. G. South and F. D. Blyth. 6,851. May 3.
Portland Cement.—(Complete Specification). G. Higham. 6,855. May 3.
Gas Producers for Metallurgical and other Purposes.—(Complete Specification). J. J. Shedlock and J. J. Meldrum. 6,864. May 3.
Asbestos Fuel.—(Complete Specification). H. C. Turner. 6,868. May 3.
Substantive Colouring Matters. J. V. Johnson. 6,874. May 3.
Colouring Matters. J. V. Johnson. 6,875. May 3.
Smoke Prevention. J. Ashworth and W. Kneen. 6,876. May 3.
Combustible Coal-Brick.—(Complete Specification). J. J. Hertz and A. Garnett. 6,877. May 3.
Colouring Matters. H. H. Lake. 6,879. May 3.
Galvanic Element with Constant Current.—(Complete Specification). van der Poppenburg. 6,893. May 3.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Week ending May 6th.

Alkali—

Holland, 400 c. R. W. Greeff & Co.
France, 210 Arnati & Harrison
Holland, 9 G. Rahn & Co.

Acetic Acid—

Holland, 52 pks. A. & M. Zimmermann
Germany, 6 G. Meyer & Co.

Holland, 25 pks. Beresford & Co.
" 26 A. & M. Zimmermann
" 170 Philipps & Graves

Acetate of Lime—

U. S., £150. Gillespie Bros. & Co.
" 85 Lister & Biggs

Antimony Ore—

Melbourne, 14 t. G. Bore & Co.
Spain, 20 Pillow, Jones, & Co.
F. Turkey, 10 c. L. & I. D. Jt. Co.
Germany, 10 O. Scholzig

Acetone—

Holland, £100. Beresford & Co.

Ammonia—

Holland, £25. Weatherley, Mead, & Co.

Bromide—

Germany, £50. Howard & Son

Boric Acid—

Italy, 20 pks. J. Puddy & Co.

Barytes—

Germany, 14 cks. O'Hara & Hoar

Germany, 23 cks. Constable, Hendel

" 24 W. Harrison &

" 103 J. Ma

Belgium, 10 J. J. Lyon &

Bones—

E. Indies, 301 t. Gonne, Croft, &

" 25 Tullock &

" 25 Culverwell, Brooks, &

U. S., 37 H. A. Lane &

Zanzibar, 10 L. & I. D. Jt.

Sydney, 8 Goad, Rigg, &

" 14 Hicks, Nash, &

G. Boor & Co. C. j. Capes & Co. F. Smith Hyslop & Symons A. Hughes W. C. Bacon & Co. F. Parbury & Co. Union Lighterage Co., Limited	Gambler Singapore, 378 " 415 " 1,347 " 10 t. " 214 " 128 pks. " 208 " 86	L. & I. D. Jt. Co. R. & J. Henderson W. H. Cole & Co. Elkan & Co. L. & I. D. Jt. Co. H. Lambert T. J. & T. Powell L. & I. D. Jt. Co.	Potassium Carbonate— France, 29 pks. Beresford & Co. " 14 Potassium Bichromate— France, 21 pks. W. H. Pridham & Co. Paraffin Wax— U. S., 830 brls. 84 cs. H. Hill & Sons " 325 " 75 Prop. Chamba. Whf. " 41 L. & I. D. Jt. Co. " 120 Rose, Wilson, & Rose " 100 G. H. Frank Rangoon, 290 brls. H. Hill & Sons Pyrites— Spain, 200 t. Anderson, Anderson, & Co.	Copper Regulus— Huelva, 94 t. Caoutchouc— New York, 17 pks. W. Symington & Co. " 3 cs. Farnworth & Jardine Addah, 22 J. P. Werner " 9 cks. F. & A. Swanry Sierra Leone, 10 brls. Pickering & Berthoud Rangoon, 656 bgs. J. P. Werner Pram Pram, 45 cks. Kronig & Siegler " 2 Edwards Bros. Salt Pond, 2 5 cs. F. & A. Swanry " 1 F. Schaeffer & Co. " 1 H. Havard & Co. " 1 N. P. Nathan & Son " 3 cs. 1 Davies, Robbins, & Co. " 2 1 Pickering & Berthoud " 1 28 A. Miller, Bros., & Co. " 3 R. Barbour & Bros. " 1 2 R. Muller " 1 Pitt Bros. Cape Coast, 1 3 cs. Miller, Bros., & Co. " 5 L. Hart & Co. " 1 J. Bowden & Co. " 1 11 Iblers & Bell " 7 W. A. M'iver & Co. " 1 Fletcher & Fraser " 3 Mordaunt Bros. " 1 Davies, Robbins, & Co. Assinee, 1 W. D. Woodin " 1 Pickering & Berthoud " 1 A. Verdier " 1 F. Schaeffer & Co. " 1 Edwards Bros. " 1 Radcliffe & Durant " 1 A. Herschel " 2 Millward, Bradbury, & Co. Grand Bassa, 1 brl. Cie Francaise Sierra Leone, 15 cks. Paterson, Zachonis, & Co. " 2 Ashton, Kinder, & Co. " 13 Cie Francaise " 29 " 136 Pickering & Berthoud " 4 A. Herschell Bathurst, 6 Cie Francaise " 14 A. Reis " 7 A. Cross & Co. " 1 2 cs. A. Cross & Co. Goree, 3 Cie Francaise " 1
L. & I. D. Jt. Co. Adamson, Gillfillan, & Co. Kebbel, Son, & Co. L. & I. D. Jt. Co. C. Atkins & Nisbet Hoare, Wilson, & Co. Knight, Hayman, & Co. Kebbel, Son, & Co. L. & I. D. Jt. Co. J. E. Wilson L. & I. D. Jt. Co. Kebbel, Son, & Co. Thames S. T. Co. Anderson, Weber, & Smith	Alizarine Holland, 57 J. Ferry & Co. Cutch E. Indies, 4,000 Hoare, Wilson, & Co. " 1,232 H. A. Lichfield & Co. Dyestuffs (otherwise undescribed) Germany, 19 pks. Flemings' Oil and Chemical Co.	Glycerine— Holland, £365 Spies, Bros., & Co. " 69 Knight & Morris Germany, 245 Beresford & Co. " 170 Holland, 64 F. W. Heilgers & Co. Glucose— Germany, 600 pks 600 c. J. Barber & Co. " 25 799 L. Sutro & Co. " 300 Dutrulle, Solomon & Co. U. S., 130 1,015 F. J. Warren " 100 500 R. G. Hall & Co. Germany, 11 180 J. Knill & Co. U. S., 440 1,240 T. M. Duché & Sons " 25 125 Hyde, Nash, & Co. Germany, 20 160 C. Hapke " 35 280 T. M. Duché & Sons U. S., 1,600 1,600 A. Dawson " 120 120 T. M. Duché & Sons " 100 560 Propts. Scott's Whf. Germany, 24 202 J. Knill & Co. " 200 200 J. F. Ohlmann	Plumbago— Holland, 4 cks. Brown & Elmslie E. Indies, 87 brls. Hoare, Wilson, & Co. Germany, 147 cks. Brown & Elmslie Holland, 15 J. Thredder, Son, & Co. E. Indies, 183 brls. J. Thredder, Son, & Co. " 122 J. Owen Holland, 55 Doulton & Co. " 20 cs. J. Barber & Co. Pyrites— Spain, 1,340 t. Societe Commerciale Sodium Acetate— Treport, £85 Prop. Hay's Wf. Saltpetre— E. Indies, 225 bgs. Clift, Nicholson, & Co. Germany, 11 cks. Craven & Co. " 118 P. Hecker & Co. " 250 bgs. C. Wimbie & Co. E. Indies, 1,435 L. & I. D. Jt. Co. " 100 " 1,822 Stearine— France, 9 sks. Van Geelkerken, & Co. Holland, 25 bgs. Perkins & Homer Belgium, 62 H. Hill & Sons Tartaric Acid— Holland, 40 pks. B. & F. Wf. Co. " 12 " 5 Northcott & Sons Tartars— Italy, £1,400 B. Jacob & Sons " 407 Fellows, Merton, & Co. " 1,400 Thames S. Tug Co. " 1,000 Howards & Sons " 605 Seager, White, & Co. Tar— Germany, 200 brls. Linck, Moeller, & Co. France, 21,000 g. Burt, Boulton, & Co. Ultramarine— Holland, 15 pks. Haefner, Hilpert, & Co. Germany, 15 cs G. Steinhoff Belgium, 9 pks. W. Harrison & Co.	Copper Precipitate— Villa Real, 17,000 bgs. Mason & Barry Huelva, 1,579 Chemicals (otherwise undescribed) Rotterdam, 10 cks. Dyestuffs— Diri Diri New York, 30 bgs. W. Clucas Fustic Jamaica, 148 t. Mildred, Carthagena, 788 ps. Goyenecke, & Co. Extract New York, 50 bxs. Havre, 16 cks. Cunard S. S. Co., Lmt. Rouen, 161 100 cs. Co-op. W'sale Socy., Lmt. Gambler Singapore, 1,674 bls. Cutch Rangoon, 2,088 bgs. 20,574 bxs. Cochineal Teneriffe, 40 bgs. Kuhner, Hender-son, & Co. " 13 H. R. Toby & Co. " 3 Gr. Canary, 20 sks. Swanston & Co. " 67 F. A. Woygt & Co. Myrabolams Bombay, 72 bgs. Beyts, Craig, & Co. " 512 " 660 D. Sassoon & Co. " 2,814 " 310 Logwood Savannah-la-Mar, 104 t. E. Brownhill & Co. Jamaica, 434
tar— B. & F. Wf. Co. C. F. Gerhardt Major & Field W. C. Bacon & Co. C. Christopherson & Co. W. C. Bacon & Co. sh— Petri Bros. Harrold Bros. H. Bath & Son W. H. Pridham & Co. (otherwise undescribed) A. & M. Zimmermann Page, Son, & Co. A. & M. Zimmermann Phillipps & Graves Hernu, Peron, & Co. T. H. Lee Phillipps & Graves A. & M. Zimmermann	Gutta Percha— Singapore, 90 c. N. S. S. Co. " 40 Jackson & Till " 485 H. W. Jewesbury & Co. France, 20 Flageollet & Co. Singapore, 934 Kaltenbach & Schmitz Guano— Lobcs, 1,180 t. Anglo Cont. Guano. Wks Isinglass— Singapore, 4 pks. S. Barrow & Bros. E. Indies, 4 Clarke & Smith " 5 L. & I. D. Jt. Co. Singapore, 24 Demerara, 6 Singapore, 3 Brettesnoe, 53 J. Jensen & Co., Ltd. Demerara, 6 Lewis & Peat Manure— Belgium, 170 t. A. Hunter & Co. Germany, 50 " 5 Anglo Contl. Guano Wks. U. S., 8 Las Palmas, 69 N. W. African Co., Lmt. Holland, 318 Lawes Manure Co. France, 120 T. Farmer & Co. " 150 S. F. Waters & Co. Holland, 370 A. Hunter & Co. Germany, 40 F. W. Berk & Co. Manganese Ore— Adelaide, 171 t. Harrold Bros Naphthalene— Holland, £20 R. Morrison & Co. Naptha— Germany, 27 drs. Stein Bros. Holland, 1 Nitre— Iquique, 12,565 bgs. W. Montgomery & Co. " 12,565 H. Bath & Son Peru, 8,650 cu. bgs. A. Ford & Co. Pearl Ash— France, 132 c. Petri Bros. Potassium Sulphate— Germany, 68 pks. Bessler, Wachter, & Co. " 30 H. Lambert " 21 cks. Burgoyne, Bur-bridge, & Co. France, 21 pks. F. W. Berk & Co. Potassium Hydrate— Germany, 3 pks. Hernu, Peron, & Co. Potassium Muriate— Germany, 100 pks. F. W. Berk & Co.	Pyrites— Spain, 1,340 t. Societe Commerciale Sodium Acetate— Treport, £85 Prop. Hay's Wf. Saltpetre— E. Indies, 225 bgs. Clift, Nicholson, & Co. Germany, 11 cks. Craven & Co. " 118 P. Hecker & Co. " 250 bgs. C. Wimbie & Co. E. Indies, 1,435 L. & I. D. Jt. Co. " 100 " 1,822 Stearine— France, 9 sks. Van Geelkerken, & Co. Holland, 25 bgs. Perkins & Homer Belgium, 62 H. Hill & Sons Tartaric Acid— Holland, 40 pks. B. & F. Wf. Co. " 12 " 5 Northcott & Sons Tartars— Italy, £1,400 B. Jacob & Sons " 407 Fellows, Merton, & Co. " 1,400 Thames S. Tug Co. " 1,000 Howards & Sons " 605 Seager, White, & Co. Tar— Germany, 200 brls. Linck, Moeller, & Co. France, 21,000 g. Burt, Boulton, & Co. Ultramarine— Holland, 15 pks. Haefner, Hilpert, & Co. Germany, 15 cs G. Steinhoff Belgium, 9 pks. W. Harrison & Co.	Albume— Bruges, 20 cs. J. T. Fletcher & Co. Acetate of Lime— New York, 762 bgs. " 861 " 713 Borax— New York, 1 brl. Bones— Boston, 154 bgs. Cadiz, 1,120 Strumpel and M. S. Brown Barytes— Antwerp, 9 cks. 30 bgs. Bone Ash— Rio Grande, 81 t. Redfern, Alexander, & Co. Bone Meal— Bombay, 3,133 bgs. " 4,000 Caustic Potash— Dunkirk, 21 dms.	Copper Precipitate— Villa Real, 17,000 bgs. Mason & Barry Huelva, 1,579 Chemicals (otherwise undescribed) Rotterdam, 10 cks. Dyestuffs— Diri Diri New York, 30 bgs. W. Clucas Fustic Jamaica, 148 t. Mildred, Carthagena, 788 ps. Goyenecke, & Co. Extract New York, 50 bxs. Havre, 16 cks. Cunard S. S. Co., Lmt. Rouen, 161 100 cs. Co-op. W'sale Socy., Lmt. Gambler Singapore, 1,674 bls. Cutch Rangoon, 2,088 bgs. 20,574 bxs. Cochineal Teneriffe, 40 bgs. Kuhner, Hender-son, & Co. " 13 H. R. Toby & Co. " 3 Gr. Canary, 20 sks. Swanston & Co. " 67 F. A. Woygt & Co. Myrabolams Bombay, 72 bgs. Beyts, Craig, & Co. " 512 " 660 D. Sassoon & Co. " 2,814 " 310 Logwood Savannah-la-Mar, 104 t. E. Brownhill & Co. Jamaica, 434
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Dyestuffs (<i>otherwise undescribed</i>)		
New York,	5 cs.	Hattrick & Co.
Glucose		
New York,	200 brls.	
Hamburg,		47 cks.
New York,	68	
"	50	
Horn Piths —		
Rio Grande,	10,000	Redfern, Alexander, & Co
Isinglass —		
Maranham,	5 cks.	Gunston, Sons, & Co.
"	1	R. Singlehurst & Co.
Manganese Ore —		
Gotenburgh,	150 t.	Macqueen Bros.
Manure —		
Jersey,	100 bgs. 1 pt-bg.	G. Hadfield & Co.
Naphtha —		
New York,	3,700 bgs.	Meade-King, Robinson, & Co.
Oxalic Acid —		
Rotterdam,	6 cks.	
Paraffin Wax —		
New York,	130 brls.	Richardson, Spence, & Co
Phosphate of Lime —		
Antwerp,	380 t.	
Potash Salts —		
Hamburg,	1,700 bgs.	
Pyrites —		
Huelva,	939 t.	Tennants & Co.
"	1,046	Matheson & Co
"	1,500	"
"	1,586	"
"	1,528	Tennants & Co.
Soda —		
Rotterdam,	65 brls.	
Sodium Nitrate —		
Iquique,	12,990 bgs.	
"	9,200	J. T. North
Saltpetre —		
Hamburg,	104 cks.	
"	12	
Tar —		
Barcelona,	1 cs.	* H. Tozeret
Wilmington,	2,889 brls.	
Tartar —		
Bordeaux,	52 cks.	
Tartaric Acid —		
Rotterdam,	12 cks.	
"	3	
Antwerp,	1	
Ultramarine —		
Rotterdam,	4 cks. 5 cs. 40 brls.	
Waste Salt —		
Hamburg,	162 t.	
"	1,016 bgs.	
Zinc Oxide —		
Rotterdam,	100 cks.	O. H. Marcus
Antwerp,	95 brls.	J. T. Fletcher & Co.
"	115	
Hamburg,	96	

GLASGOW.

Week ending May 8th.

Chemicals (*otherwise undescribed*)
Hamburg, 3 cks. 1 cs.
Alum—
Hamburg, 240 cks.
Dyestuffs—
Madder
Rotterdam, 7 cks. J. Rankine & Son
Alizarine
Rotterdam, 85 cks.
" 99
Extracts
New York, 10 cs.
Nantes, 549 cks.
Glycerine—
Hamburg, 20 drms.
Muriatic Acid—
Hamburg, 1 cs.
Nitric Acid—
Hamburg, 1 cs.
Paraffin Wax—
New York, 505 bks. H. Hill & Son
" 370
Saltpetre—
Rotterdam, 6 cks. J. Rankine & Son
Hamburg, 100 kgs. J. Poynter & Son, Limited
Sulphuric Acid—
Hamburg, 1 drum.
Tartaric Acid
Rotterdam, 3 cks.
Waste Salt—
Hamburg, 1,000 bgs.
" 223 t.

TYNE.

Week ending May 8th.

Barytes—
Antwerp, 50 bgs. Tyne S. S. Co.
Copper Precipitate—
Huelva, 256 t.
Copper Ore—
Bergen, 41 cks.
Chemicals (*otherwise undescribed*)
Hamburg, 1 ck. Tyne S. S. Co.
Glucose—
Hamburg, 20 cks. Tyne S. S. Co.
Rotterdam, 20 bgs. „
Guanó—
Bote, 2,162 bgs.
Pyrites—
Huelva, 1,046 t.
Phosphate—
Antwerp, 185 t. Langdale's Chemical
Manure Co.
Sodium Silicate—
Rotterdam, 1 ck. Tyne S. S. Co.

Sulphur Ore— Pomaron, 1,200 t.	Mason & Barry
Waste Salt— Hamburg, 165 t.	

HULL.

Week ending May 8th.

Acetate of Lime—
St. Malmo, 20 bgs. Hutchinson & Sons

Ammonia—
Rotterdam, 1 pkg. W. & C. L. Ringrose

Alum—
Rotterdam, 16 cks.

Alumina Sulphate—
Rotterdam, 80 cks. W. & C. L. Ringrose

Acids (*otherwise undescribed*)—
Hamburg, 1 cs. Wilson, Sons, & Co.
Rotterdam, 6 cks. W. & C. L. Ringrose
Rotterdam, 2 cks. Hutchinson & Sons

Barytes—
Bremen, 23 cks. Wilson, Sons, & Co.
Antwerp, 80 H. F. Pudsey
Strauss, 23 Tudor & Sons

Benzole—
Danzig, 4 pks. Wilson, Sons, & Co.

Copperas—
Strauss, 31 cks.

Chemicals (*otherwise undescribed*)
Antwerp, 34 pkgs. Wilson, Sons, & Co.

Dyestuffs—
Alizarine
Rotterdam, 20 cks. Hutchinson & Sons
" 6 W & C. L. Ringrose
" 16 "
" 25 Hutchinson & Sons
" 60 3 cs. "
Extracts
Rouen, 85 20 Rawson & Robinson
" 40 Wilson, Sons, & Co.

Kennet
Rotterdam, 2 cks.

Ferro Chrome—
Rotterdam, 1 cs. Hutchinson & Sons

Glycerine—
Amsterdam, 10 pks. W. & C. L. Ringrose

Glucose—
Hamburg, 10 cks. Rawson & Robinson
" 12 brls. Bailey & Leatham
" 40 100 bgs.
" 10
" 13
Stettin, 117 100 Wilson, Sons, & Co.

Naphthaline—
Rotterdam, 8 cks. G. Lawsen & Sons

Naphthol—
Rotterdam, 3 brls. Wilson, Sons, & Co.

Oxide—
Rotterdam, 12 cks. Hutchinson & Sons

Potash—
Rotterdam, 45 cks.

Phosphate—
Ghent, 160 t. Wilson, Sons, & C
Pyrites—
Huelva, 930 t J. Dalton, Holmes,
& C
Sulphur —
Antwerp, 15 bgs. Wilson, Sons, & C
Rotterdam, 4 cs. G. Lawson & So
Turpentine—
Libau, 128 brls, 1 cs.

GRIMSBY.

Week ending May 3rd.

Chemicals	<i>(otherwise undscribed)</i>
Hamburg,	5 cks.
Dyestuffs	<i>(otherwise undscribed)</i>
Antwerp,	6 pks.
Manure—	
Kainit	
Hamburg,	500 bgs.
Zinc Ashes—	
Antwerp,	25 cks.

GOOLE.

Week ending April 30th.

Alkali—
Rotterdam, 100 bgs.
Aluminium Sulphate—
Antwerp, 43 brls.
Antimony—
Boulogne, 4 cks.
Antimony Ore—
Boulogne, 1 ck.
Chrome Acetate—
Rotterdam, 11 cks.
Dyestuffs—
Alizarine
Rotterdam, 48 cks.
Logwood
Jamaica, 251 t.
Dyestuffs (*otherwise undescribed*)
Boulogne, 20 cks. 4 cs. 2 crbys.
Glucose—
Hamburg, 18 cks. 100 bgs.
Manure—
Phosphate Rock
Ghent, 800 bgs.
Potassium Muriate—
Rotterdam, 10 cks.
Plumbago—
Boulogne, 1 cs. 13 cks.
Potash—
Dunkirk, 37 drums. 57 cks.
Calais, 8 brls.
Saltpetre—
Rotterdam, 100 bgs.
Hamburg, 88 cks.
Tartars—
Rotterdam, 5 cks.
Waste Salt—
Hamburg, 1,391 cks. 355 t.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.		Acids (otherwise undescribed)		Cream of Tartar—		Chemicals (otherwise undescribed)	
Week ending May 3rd.		Cape Town, 30 pks.	£21	Wellington, 2 c.	£12	Cape Town, 10 kgs.	
		Boracic Acid—		Oitic Acid—		Barcelona, 6 c.	
		Melbourne, 1 t 8 c.	£55	Hamburg, 20 kgs.	£142	Adelaide, 41 pks.	
Ammonia—		Carbolic Solid—		M. Video, 1 ck.	9	Auckland, 15	
Cadiz, 10 c.	£25	New York, 1 t. 16 c.	£22	B. Ayres, 5 brls.	105	Yokohama, 7 cs.	£1
Ammonium Carbonate—		Rotterdam, 2 17	250	Melbourne, 1 t.	137	Dunedin, 1 t. 1 c.	1
Melbourne, 20 cs.	£36	Barcelona, 1	80	Genoa, 2	295		
Montreal, 1 t. 10 c.	£47	Genoa, 18	64	"	300	Coal Products—	
New York, 13 6	417	Caustic Soda—		Hamburg, 1 5 c.	170	Greenote Salts	
Ammonium Sulphate—		Cape Town, 6 c.	£12	Marseilles, 2 c.	15	Philadelphia, 134 cks.	£3
Canaria, 8 t. 10 c.	£111	Terneuzen, 10 t. 4	120	Moscow, 10	75	Naphtha	
" 3 10 c.	45	Victoria B. C, 18	133			Sydney, 20 drms.	£
Rotterdam, 10 4	115	Sydney, 2 1	30	Copper Sulphate—		Anthracene	
Ghent, 64	810	Collodion—		Tarragona, 35 t. 1 c.	£744	Dusseldorf, 88 cks.	£8
Rouen, 5	57	Sydney, 2 cs.	£2	Genoa, 15	350	Benzol	
Dunkirk, 20	228	Carbolic Acid—		Tarragona, 20	350	Rotterdam, 54 cks.	£6
Halifax, 3	26	Melbourne, 10 cs.	£22	Genoa, 95 19 c.	2,261	Hamburg, 20 pns.	2
Antwerp, 202 10	2,424	Algoa Bay, 4	26	" 40 3	985	Rotterdam, 12 drms.	3
Antiqua, 1 9	4	Chloride of Lime—		Caustic Potash—		Tar	
Barbadoes, 100	1,197	Algoa Bay, 1 t. 1 c.	£22	Sydney, 3 t. 19 c.	£78	Cape Town, 8 drms.	£
Trinidad, 8	93					Bombay, 17 rls.	
						Melbourne, 20 pks.	

Pitch Bombay, 135 t. Gijon, 612 Caen, 517 Dunkirk, 319 Melbourne, 22 pks. Constantinople, 150 brls. Paris, 13 cks. Bordeaux, 200 t. Dinsburg, 125	50 brls. £15 250 50 15 912 827 510 4 45 50 1,100 187
Disinfectants— Hamburg, 25 cks. Sydney, 19 Havre, 48 pks. Natal, 5 Paris, 55 cks. Sydney, 20	£150 114 31 30 44 80 32
Guano— Guadalupe, 190 t. Antigua, 6 2 c. Trinidad, 41 17	£1,900 74 440
Hyposulphite of Lime— Rotterdam, 1,600 lbs.	£180
Hydrochloric Acid— Bombay, 5 pks.	£14
Manure— Malaga, 50 t. Nevis, 35 Antigua, 10 Dominica, 5 St. Kitts, 55 Barbadoes, 60 9 c. St. Vincent, 10 Barbadoes, 19 11 Danzig, 15 Amsterdam, 160 Kotterdam, 60 Valencia, 168 11 Gothenburg, 97 9 Pt. Chalmers, 100 Trinidad, 180 Barbadoes, 50 St. Kitts, 6 Antigua, 1 5 Havre, 20 Rouen, 30	£400 380 100 50 550 600 100 390 85 1,280 480 1,380 367 1,350 1,348 650 69 15 220 180
Oxalic Acid— Rotterdam, 3 t. 9 c. Lisbon, 8 c.	£100 £10
Potash— Lisbon, 14 c. Calcutta, 20 c. Gothenburg, 10	£19 115 22
Phosphorus— Yokohama, 500 lbs. Hong Kong, 1 c. Santa Cruz, 6 c.	£62 37 15
Potassium Chlorate— Rotterdam, 1 t. Melbourne, 1 Algon Bay, 1 c. Melbourne, 1	41 45 7 45
Potassium Permanganate— Yokohama, 500 lbs.	£25
Potassium Iodide— Yokohama, 300 lbs.	£180
Saltpetre— Sydney, 1 t. Madaira, 16 c. Brussels, 8 Rosario, 4	£24 42 42 92
Soda Salts— Montreal, 5 c.	£22
Sodium Carbonate— Marseilles, 10 t.	£66
Superphosphate— Canaria, 9 t. Halifax, 27 Trinidad, 10	£46 110 52
Sodium Bicarbonate Sydney, 10 c. Yokohama, 10 pks.	£11 25
Sal ammoniac— Paris, 1 t. 8 c.	£10
Acetic Acid Town, 1 t. 1 c.	£21

Soda Crystals— Newcastle, 9 t. 15 c. Tartaric Acid— Sydney, 1 Wellington, 2 Sydney, 10 cks. " 20 kgs.	£29 £20 14 67 114
LIVERPOOL <i>Week ending May 7th.</i>	
Ammonium Carbonate— Genoa, 1 t. 10 c. Hamburg, 1 2 2 q.	£55 28
Albumen— Boston, 1 t. 15 c. 1 q.	£110
Alum Cake— Calcutta, 4 t. 5 c.	£13
Alum— Melbourne, 5 t. 10 c. Montreal, 12 5 Volo, 2 3 Bombay, 8 Cape Town, 4 Baltimore, 15 6 3 q. Bari, 1 7	£28 149 11 42 17 71 6
Ammonia— Valparaiso, 6 c.	£8
Ammonium Muriate— Boston, 3 t. 9 c. Philadelphia, 5 16 3 q.	£87 133
Ammonium Sulphate— Antwerp, 10 t. Bremerhaven, 19 Hamburg, 20 Valencia, 127 " 50 Nantes, 30 11 c. Valencia, 101 12 Hamburg, 5 Rotterdam, 30 Bordeaux, 35 1 St. Nazaire, 66 19 3 Salonica, 10 Valencia, 87	£120 228 240 1,524 600 410 1,120 56 360 224 204 12 1,044
Bleaching Powder— Ancona, 10 pps. Boston, 1,120 cks. Bruges, 25 Genoa, 78 Ghent, 29 Hamburg, 291 Leghorn, 11 Mexico City, 60 brls. Montreal, 44 Naples, 18 New York, 253 Philadelphia, 118 Rio Janeiro, 10 c. Rouen, 196 San Sebastian, 29 Trieste, 16 Vera Cruz, 10 Ancona, 12 Antwerp, 40 Ghent, 14 Hamburg, 50 New York, 98 Odessa, 61 Oporto, 7 Pernambuco, 3 St. Louis, 35 pks.	95 tcs. 30 pps. 10 c. 25 15 bxs.
Boracic Acid— Antwerp, 12 c. 1 q. Stockholm, 4 12	£95 138
Borate of Lime— Rotterdam, 9 t. 18 c. 3 q.	£120
Bone Waste— Rouen, 29 t. Hamburg, 29	£760 130
Brimstone— Philadelphia, 6 t.	£164
Borax— Montreal, 1 t. Corunna, 9 c. 2 q. Rouen, 12 8 Stockholm, 3 cks. Montreal, 1 brl. 6	£29 15 972 13 57
Charcoal— Hamburg, 51 t.	£225
Cobalt Oxide— Bordeaux, 14 c.	£6
Citric Acid— Corunna, 9 c.	£14
Copperas— Rotterdam, 1 t. 16 c. Constantinople, 8 6 2 q. Sydney, 5 18 " 1 10 " 1 10 " 10 c. 3 q.	£40 19 13 5 57

Caustic Soda— Adelaide, 20 dms. Batoum, 176 Copenhagen, 30 Genoa, 20 " 20 Hamburg, 140 kgs. La Guayra, 10 Malta, 72 Montreal, 300 New York, 300 Oporto, 15 Pernambuco, 30 Philadelphia, 50 Rio Grande du Sol, 50 Rouen, 16 St. Petersburg, 79 Sydney, 40 Ancona, 5 Antwerp, 53 Bahia, 10 Barcelona, 26 Calcutta, 50 Chicago, 50 Corunna, 51 Dunedin, 10 Galatz, 10 Hamburg, 5 Maranham, 225 Montreal, 50 Nagasaki, 25 Naples, 25 New York, 225 Odessa, 225 Philadelphia, 135 Rio Grande du Sol, 75 Rotterdam, 4 St. Louis, 38 San Sebastian, 10 Santander, 24 Seville, 100 Sydney, 45 " 25 bxs.	
Copper Sulphate— Bordeaux, 34 t. 8 c. Sydney, 2 Liquique, 10 8 Marseilles, 5 3 Odessa, 5 3 Tarragona, 15 2 Bilbao, 5 1 3 q. Bordeaux, 10 15 Havre, 1 19 Malaga, 19 18 2 Antwerp, 10 2 1 Bordeaux, 84 13 Venice, 10 1 Vigo, 9 Genoa, 33 19 1 Leghorn, 2 3 Barcelona, 5 3 1 Bari, 18 3 Marseilles, 50 18 3 Nantes, 32 19 Tarragona, 10 1 Passage, 10 3 Nantes, 10 6 Santos, 19 19 3 Venice, 39 13 Bordeaux, 20 16 3 Salonica, 12 Genoa, 19 11 3 Marseilles, 9 17 2 Rouen, 27 17 Bordeaux, 40 5 1 " 30 Leghorn, 10 2 2 Marseilles, 23 4 3	£1,043 47 244 119 120 348 90 242 13 195 223 1,841 240 12 624 38 129 20 1,315 795 248 195 220 6 399 975 411 328 208 825 830 757 253 481
Carbolic Acid— Rotterdam, 14 t. 5 c. New York, 1 10 Paris, 2 9 Genoa, 19 2 q. Leghorn, 5 3 St. Louis, 5 1 New Orleans, 11 3 Genoa, 9 3 " 9 3	£1,710 145 255 100 36 459 93 65
Chemicals (otherwise undescribed) Trinidad, 175 cs. Vera Cruz, 5 t. 16 c. " 1 cs. 12 brls. Philadelphia, 11	£260 £56 84 13
Disinfectants— Calcutta, 495 galls.	£39
Dried Blood— Montreal, 1 t.	£15
Glycerine— Hamburg, 8 t. 3 c.	£196
Guano— Havana, 265 t. 13 c. 2 q. Havre, 49 t. 6 c.	£2,268 £355
Ground Spar— Boston, 10 t. New York, 10 2 c. Boston, 1 1 3 q.	£30 30 10

Iron Oxide— Gijon, 2 t. 10 c. 1 q. Iodine— New York, 4 t. Genoa, 10 c. Lime Sulphate— Santander, 5 t. Magnesia— Rio Janeiro, 5 cs. Genoa, 1 Magnesium Calclde— Genoa, 1 cs. Manure— Hamburg, 24 t. 5 c. 3 q. Barbadoes, 50 2 Rochefort, 200 2 Havre, 50 Magnesium Chlorate— Genoa, 16 t. 1 q. Nitric Acid— Santos, 5 carboys. Potassium Chromate— Genoa, 1 t. Potassium Bicarbonate— Montreal, 5 c. Potash— Palermo, 9 t. 15 c. Phosphorus— Shanghai, 10 cs. Santander, 3 t. 3 q. Singapore, 15 Havana, 10 1 Mexico, 1 t.	£6 £2,400 6 £2 £3 £7 4 62 15 £1 £10 £25 £1 £20 £6 30 7 127 219
Pitch Galatz, 100 brls. Genoa, 1,842 t. Potassium Manganate— Valparaiso, 2 c. 1 q. Potassium Stannate— Bombay, 12 c. 2 Potassium Bichromate— Salonica, 1 t. 7 c. Santos, 1 3 Potassium Chlorate— Catania, 10 c. Gothenburg, 2 t. 10 St. Petersburg, 2 10 San Sebastian, 3 3 q. Santander, 10 B. Ayres, 3 10 Shanghai, 1 2 Stockholm, 4 Sydney, 10 Montreal, 1 10 Philadelphia, 5 San Francisco, 2 Santander, 10 Oporto, 1 Shanghai, 3 15 Vera Cruz, 6 Gothenburg, 15 Higo, 3 13 1 q. Constantinople, 2 10 Hamburg, 6 10 San Francisco, 1 5	£11 £40 £41 50 £23 168 111 13 21 150 61 168 459 66 221 93 23 40 170 11 640 140 116 285 53
Potassium Carbonate— Philadelphia, 9 c. 3 q. Sodium Chlorate— Hamburg, 1 t. Sodium Silicate— Ancona, 100 cks. Salonica, 15 Oporto, 6 Seville, 50 Soda Ash— Baltimore, 683 cks. 573 tcs. Barcelona, 30 brls. Boston, 131 58 1,700 bxs. Callao, 20 dms. Canada, 5 Genoa, 19 brls. Lisbon, 16 Melbourne, 60 Monte Video, 50 Montreal, 34 33 Newcastle, 20 New Glasgow, 30 New York, 970 Oporto, 31 Philadelphia, 395 546 Porto Alegre, 100 Rio Janeiro, 121 Santos, 2 Seville, 50 Sherbrooke, 13 Smyrna, 36 Baltimore, 60 Barcelona, 18 Maranham, 80 Monte Video, 50 Montreal, 67 New York, 130	

Rio Grande du Sol,	50
Rio Janeiro,	70
Santanter, 21 cks.	250
Syra,	
Salt—	
Amsterdam, 200 t.	
Bathurst, 401	
Belize, 10	
Bonny, 75	
Boston, 350	
Brisbane, 100	
Boctouche, 175	
Buguma, 25	
Charlotte Town, 35	
Korsoer, 390	
Lagos, 100	
Montreal, 875	13 c.
New Orleans, 4	3
Old Calabar, 125	6
Paspebiac, 375	
Quebec, 1,031	12
Rotterdam, 343	
Salonica, 6%	
Shediac, 200	
Sierra Leone, 100	
Bakana, 10	
Baltimore, 140	
Bruges, 150	
Calcutta, 4,597	
Cape Palmas, 5%	
Dunedin, 38%	
East London, 22%	
Milwaukee, 65	
Montreal, 7	16
Newcastle, 520	
New York, 65	
Philadelphia, 65	
San Francisco, 66	10
Santos, 4%	
Sodium Bicarbonate—	
Alexandria, 50 brls.	
Ancona, 40 kgs.	
Antwerp, 20	
Bari, 40	
Bordeaux, 15	68 cks.
Boston, 12 pks.	8
Kingston, 16	
London, Ont., 50	
Marseilles, 20	
Montreal, 25	
Naples, 100	
New Orleans, 200	
Rouen, 120	
Seville, 125 brls.	
Toronto, 100	
Vera Cruz, 40	
Danzig, 100	
Stettin, 80	10
Soda Crystals—	
Bilbao, 34 brls.	
Singapore, 17 cks.	
Alexandria, 20	
Gibraltar, 40	10 kgs.
London, O., 100	
Malta, 100	
New York, 50	
Quebec, 25	
Sodium Bichromate—	
Piræus, 6 c.	£125
Havre, 4 t. 15	140
Sodium Borate—	
Hamburg, 7 t. 17 c. 1 q.	£220
S. Petersburg, 19	300
Stettin, 12	366
Stockholm, 12	326
Sodium Arseniate—	
Boston, 3 t. 11 c. 1 q.	£40
Sulphuric Acid—	
Pernambuco, 4 c. 2 q.	£10
Superphosphate—	
Gr. Canary, 20 t. 2 c. 1 q.	£148
Sulphur—	
Lisbon, 11 t. 3 q.	£89
Boston, 50	207
Vigo, 10	58
Boston, 49	19
Calcutta, 22	10
Sodium Nitrate—	
Santander, 1 t. 17 c. 1 q.	£16
Saltcake—	
Baltimore, 79 t. 3 c. 2 q.	£183
Philadelphia, 49	114
Baltimore, 95	18
Ghent, 100	140
Sugar of Lead—	
Naples, 2 t.	£45
Calcutta, 4 c. 3 q.	60
Saltpetre—	
Para, 1 t. 1 c. 1 q.	£2
Santos, 2	19
Syra, 1	17
Pernambuco, 2	18

Salammoniac—	
Beyrout, 11 c. 1 q.	£20
Constantinople, 1	2
Malta, 4	3
Alexandria, 11	20
Barcelona, 40	12 cks.
Constantinople, 2	68
Odessa, 1	8
Soda Salts—	
Montreal, 5	£130
Sheep Dip—	
Natal, 1 t. 10 c.	£80
E. London, 1	10
Algoa Bay, 1	10
Natal, 1	10
Tar—	
Curacao, 50 dms.	
Sierra Leone, 17 brls.	
Belize, 50	
San Francisco, 50	
Tartaric Acid—	
Talcuano, 2 c. 3 q.	£10
Corunna, 2	14
Zinc Chlorate—	
Bombay, 2 t. 17 c.	£60
" 5	2 q.
" 2	6
Zinc Oxide—	
Piræus, 10 c. 2 q.	£13

TYNE.

Week ending May 8th.

Alumina—	
Rouen, 9 t. 19 c.	
Alkali—	
Hamburg, 4 t. 16 c.	
Christiania, 37	7
Stockholm, 2	12
Rotterdam, 1	2
Arsenic—	
Helsingfors, 1 t. 1 c.	
Antimony—	
New York, 30 t.	
Rotterdam, 4	10 c.
Ammonium Carbonate—	
Rotterdam, 2 t. 4 c.	
Barytes Carbonate—	
Hamburg, 5 t.	
Barytes—	
Rouen, 15 t.	
Barium Chloride—	
Rouen, 5 t. 3 c.	
Bleaching Powder—	
Ancona, 16 t. 7 c.	
New York, 50	4
Lisbon, 9	17
Malmo, 9	5
Christiania, 1	17
Rotterdam, 5	8
Odense, 24	17
Antwerp, 79	4
Hamburg, 70	11
Stockholm, 3	17
Helsingfors, 12	14
Rouen, 25	14
St. Petersburg, 113 t. 18 c.	
Borax—	
Bilbao, 1 c.	
Carbolic Acid—	
Hamburg, 25 brls.	
Caustic Soda—	
New York, 100 t. 2 c.	
Philadelphia, 154	1
Antwerp, 100	2
Hamburg, 5	12
Gothenburg, 9	4
Abo, 2	2
Stockholm, 6	14
Wasa, 2	9
Abo, 11	17
Epsom Salts—	
Gothenburg, 1	3
Gypsum—	
New York, 72 t. 13 c.	
Litharge—	
Stockholm, 3 t. 1 c.	
Antwerp, 11	
Gothenburg, 1	19
Stockholm, 1	18
Rouen, 10	16
Magnesia—	
Hamburg, 5	
Antwerp, 3	q.
Rouen, 5	
Manure—	
Rotterdam, 50	8

Napthalene—	
Antwerp, 14 t. 10 c.	
Potassium Chlorate—	
Antwerp, 5 t. 5 c.	
Rotterdam, 3	15
Pitch—	
Antwerp, 100	
Sodium Chlorate—	
Philadelphia, 3 t. 15 c.	
Hamburg, 5	
Soda—	
Philadelphia, 23 c t. 1 c.	
Antwerp, 25	10
Rotterdam, 1	5
Esbjerg, 30	
Aalborg, 18	11
Aarhus, 17	6
Nakskov, 3	2
Stockholm, 131	16
Wasa, 3	14
Abo, 9	14
Helsingfors, 4	16
New York, 150	9
Stavanger, 5	3
Malmo, 5	18
Soda Ash—	
Gothenburg, 25 t. 10 c.	
Christiania, 8	5
Aalborg, 3	4
Philadelphia, 100	5
Antwerp, 10	6
Hamburg, 7	19
Ancona, 1	5
New York, 165	8
Stockholm, 50	11
Wasa, 26	5
Sodium Hyposulphate—	
Christiania, 1 t. 2 c.	
Saltcake—	
New York, 49 t. 3 c.	

HULL.

Week ending May 6th.

Alkali—	
Drontheim, 17 drums.	
Borax—	
Hango, 1 ck.	
Bleaching Powder—	
Drontheim, 59 cks.	
St. Petersburg, 50	
Caustic Soda—	
Antwerp, 18 drums. 3 cks.	
Dunkirk, 19	
Danzig, 71	
Helsingfors, 125	
Hango, 14	
Konigsberg, 34	
Libau, 56	
Petersburg, 500	
Chemicals (otherwise undescribed)	
Antwerp, 9 cs. 3 cks. 2 pks.	
Amsterdam, 8	
Abo, 14	100
Bremen, 2 cs. 4	
Bergen, 10	
Bostcn, 7	
Copenhagen, 119	
Christiania, 55	6
Danzig, 44	27 154 slbs.
Gothenburg, 3	11
Genoa, 76	41
Hamburg, 79	8 553
Harlingen, 4	
Helsingfors, 20	
Hango, 16	
Konigsberg, 18	30
Marseilles, 25	
Naples, 30	40
New York, 33	
Rouen, 21	24 104
Stettin, 18	
St. Petersburg, 394	140
Libau, 9	50
Dyestuffs (otherwise undescribed)	
Hamburg, 1 cs. 11 drs.	
Rotterdam, 2	2 cks. 2 pks.
Reval, 46	
Manure—	
Drontheim, 30 bgs.	
Hamburg, 343	
Rouen, 50	
Rotterdam, 500	
Stettin, 479	
Naphtha—	
Dunkirk, 23 cks.	
Pitch—	
Antwerp, 200 t.	
Genoa, 302	

Tar—	
Abo, 150 cks.	
Bremen, 100	
Gothenburg, 150	
Hamburg, 4	
Wasa, 10	

GLASGOW.

Week ending May 8th.

Alum—	
Quebec, 214½ c.	
Bones—	
Rouen, 4 t. 6 c.	£
Boracic Acid—	
Stockholm, 4 cks.	£1.
Dyestuffs—	
Madders	
Melbourne, 12½ c.	£
Extracts	
Quebec, 44½	£1.
Logwood	
Quebec, 2 t. 11 c.	£
Melbourne, 358½	11
Glycerine—	
Rouen, 12 t. 5 c.	£2.
Magnesium Sulphate—	
Melbourne, 11 t. 3¼ c.	£.
Naphtha—	
Rouen, 17¾ c.	£.
Oxalic Acid—	
Barcelona, 17¾ c.	£.
Pitch—	
Chili, 105¾	£1.
Potassium Bichromate—	
Rouen, 10 t. 13¾ c.	£30
Barcelona, 108¾	20
" 105¾	10
Gothenburg, 5	6¾
Stockholm, 1 ck.	109½
Oporto, 36¾	20
Malta, 125	80
Paraffin Wax—	
Trieste, 62 c.	£.
Rouen, 7,380 lbs.	10
Barcelona, 11 t. 13¾	30
Stockholm, 50 cks.	10
Malta, 5	7½
Potassium Prussiate—	
Rouen, 4 cks.	£3.
Amsterdam, 4 cks.	£.
Salt—	
Chili, 4 t. 10¾ c.	£.
Sodium Bichromate—	
Quebec, 3 t. 6 c.	£.
Rouen, 7	17¾
Tartar—	
Quebec, 5½ c.	£.

GRIMSBY.

Week ending May 3rd.

Alkali—	
Antwerp, 2 cks.	
Coal Products—	
Antwerp, 30 cks.	
Dieppe, 79	
Chemicals (otherwise undescribed)	
Antwerp, 8 cks. 4 pks.	
Rotterdam, 5	

GOOLE.

Week ending Apr. 30th.

Alkali—	
Boulogne, 6 cks.	
Benzole—	
Antwerp, 24 cks.	
Ghent, 15 drs.	
Hamburg, 32	
Rotterdam, 25 cks.	
Bleaching Preparations—	
Rotterdam, 28 cks.	
Coal Products—	
Ghent, 2 cs.	
Rotterdam, 64 cks.	
Chemicals (otherwise undescribed)	
Dunkirk, 2 cks.	
Dyestuffs (otherwise undescribed)	
Boulogne, 2 cks.	
Manure—	
Boulogne, 38 bgs.	
Bruges, 49	
Ghent, 199	
Pitch—	
Ghent, 180 t.	

PRICES CURRENT.

WEDNESDAY, MAY 14, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Noted are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
and 40%	per cwt.	7/-	& 12/6
ial.	"	67/6	
.., 2000	"	0 12 9	
%	nett per lb.	0 0 6 1/4	
.. .. .	"	0 0 3 1/4	
ower Salts, 30° Tw.	per bottle	0 0 8	
ylinder, 30° Tw.	"	0 2 11	
w.	per lb.	0 0 2	
.. .. .	"	0 0 1 1/4	
.. .. .	nett	0 0 4	
.. .. .	"	0 1 2	
uming 50%	per ton	15 10 0	
onohydrate)	"	5 10 0	
rites, 168°	"	3 2 6	
" 150°	"	1 6 0	
ee from arsenic, 140/145°	"	1 7 6	
(solution)	"	2 15 0	
e)	per lb.	0 1 0 1/2	
.. .. .	"	0 1 3	
powdered	per ton	13 0 0	
amp)	"	4 17 6	
hate (pure)	"	5 0 0	
(medium qualities)	"	4 10 0	
.. .. .	per lb.	0 15 0	
o=28°	per lb.	0 0 3	
=24°	"	0 0 1 1/4	
arbonate	nett	0 0 3 1/2	
riate	per ton	23 0 0	
(sal-ammoniac) 1st & 2nd	per cwt.	37/- & 35/-	
trate	per ton	40 0 0	
osphate	per lb.	0 0 10 1/2	
lphate (grey), London	per ton	11 8 9	
" (grey), Hull	"	11 7 6	
ure)	per lb.	0 10 1/4	
.. .. .	"	0 9 1/2	
.. .. .	per ton	75 0 0	
rtar emetic)	per lb.	0 1 1	
olden sulphide)	"	0 0 10	
ide	per ton	8 5 0	
mate (native)	"	3 15 0	
ate (native levigated)	"	45/- to 75/-	
wder, 35%	"	5 0 0	
fuor, 7%	"	2 10 0	
Carbon	"	13 0 0	
etate (crystal	per lb.	0 0 6	
ride	per ton	2 2 6	
t Runcorn) in bulk	"	17/6 to 35/-	
g :-			
rtificial) 20%	per lb.	0 0 9	
.. .. .	"	0 3 9	
oducts			
30% A, f.o.b. London	per unit per cwt.	0 1 5	
% nominal	per gallon	0 3 9	
90	"	0 2 9	
id (crystallised 35°)	per lb.	0 0 8	
(crude 60°)	per gallon	0 2 0	
rdinary)	"	0 0 2 1/4	
ltered for Lucigen light)	"	0 0 3	
itha 30% @ 120° C.	"	0 1 3	
, 22° Tw.	per ton	3 0 0	
Liverpool or Garston	"	1 8 0	
htha, 90% at 160°	per gallon	0 1 8	
s (crude)	"	0 0 2 1/2	
Bars	per ton	52 0 0	
te	"	25 15 0	
(copper scales)	"	54 0 0	
de)	"	30 0 0	
illed S.G. 1250°)	"	55 0 0	
.. .. .	nett, per oz.	0 0 9	
(copperas)	per ton	1 10 0	
(antimony slag)	"	2 0 0	
or cash	"	14 10 0	
: Flake (ex ship)	"	15 10 0	
(white	"	23 10 0	
(brown	"	18 5 0	
te (white lead) pure	"	19 0 0	
.. .. .	"	22 5 0	

	£	s.	d.
Lime, Acetate (brown)	per ton	7 15 0	
" (grey)	per ton	13 15 0	
Magnesium (ribbon and wire)	per oz.	0 2 3	
" Chloride (ex ship)	per ton	2 5 0	
" Carbonate	per cwt.	1 17 6	
" Hydrate	"	0 10 0	
" Sulphate (Epsom Salts)	per ton	3 0 0	
Manganese, Sulphate	"	18 0 0	
" Borate (1st and 2nd)	per cwt.	60/- & 42/6	
" Ore, 70%	per ton	4 10 0	
Methylated Spirit, 61° O.P.	per gallon	0 2 2	
Naphtha (Wood), Solvent	"	0 3 10	
" Miscible, 60° O.P.	"	0 4 6	
Oils :-			
Cotton-seed	per ton	22 10 0	
Linseed	"	26 0 0	
Lubricating, Scotch, 890°-895°	"	7 5 0	
Petroleum, Russian	per gallon	0 0 5 1/4	
" American	"	0 0 5 1/4	
Potassium (metal)	per oz.	0 3 10	
" Bichromate	per lb.	0 0 4	
" Carbonate, 90% (ex ship)	per ton	19 10 0	
" Chlorate	per lb.	0 0 4 1/4	
" Cyanide, 98%	"	0 2 0	
" Hydrate (Caustic Potash) 80/85%	per ton	22 10 0	
" (Caustic Potash) 75/80%	"	21 10 0	
" (Caustic Potash) 70/75%	"	20 15 0	
" Nitrate (refined)	per cwt.	1 2 6	
" Permanganate	"	4 2 6	
" Prussiate Yellow	per lb.	0 0 9 1/4	
" Sulphate, 90%	per ton	9 10 0	
" Muriate, 80%	"	7 15 0	
Silver (metal)	per oz.	0 3 11 1/4	
" Nitrate	"	0 2 8	
Sodium (metal)	per lb.	0 4 0	
" Carb. (refined Soda-ash) 48%	per ton	6 7 6	
" (Caustic Soda-ash) 48%	"	5 5 0	
" (Carb. Soda-ash) 48%	"	5 15 0	
" (Carb. Soda-ash) 58%	"	6 17 6	
" (Soda Crystals)	"	2 17 6	
" Acetate (ex-ship)	"	16 10 0	
" Arseniate, 45%	"	11 0 0	
" Chlorate	per lb.	0 0 6 1/4	
" Borate (Borax)	nett, per ton	29 0 0	
" Bichromate	per lb.	0 0 3	
" Hydrate (77% Caustic Soda)	per ton	10 0 0	
" (74% Caustic Soda)	"	9 0 0	
" (70% Caustic Soda)	"	8 7 6	
" (60% Caustic Soda, white)	"	8 0 0	
" (60% Caustic Soda, cream)	"	7 15 0	
" Bicarbonate	"	6 0 0	
" Hyposulphite	"	5 10 0	
" Manganate, 25%	"	9 0 0	
" Nitrate (95% ex-ship Liverpool)	per cwt.	0 8 1 1/4	
" Nitrite, 98%	per ton	28 0 0	
" Phosphate	"	15 15 0	
" Prussiate	per lb.	0 0 7 1/4	
" Silicate (glass)	per ton	5 7 6	
" (liquid, 100° Tw.)	"	3 17 6	
" Stannate, 40%	per cwt.	2 0 0	
" Sulphate (Salt-cake)	per ton	1 5 0	
" (Glauber's Salts)	"	1 10 0	
" Sulphide	"	7 15 0	
" Sulphite	"	5 5 0	
Strontium Hydrate, 98%	"	8 0 0	
Sulphocyanide Ammonium, 95%	per lb.	0 0 7 1/4	
" Barium, 95%	"	0 0 5 1/4	
" Potassium	"	0 0 8	
Sulphur (Flowers)	per ton	7 15 0	
" (Roll Brimstone)	"	6 0 0	
" Brimstone: Best Quality	"	4 7 6	
Superphosphate of Lime (26%)	"	2 12 6	
Tallow	"	25 10 0	
Tin (English Ingots)	"	98 0 0	
" Crystals	per lb.	0 0 6 1/4	
Zinc (Spelter)	per ton	23 0 0	
" Chloride (solution, 96° Tw.	"	6 0 0	

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Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

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THE PATENT LAWS AND THEIR ABUSE.

IT is a very generally recognised principle of our economy that the man who makes an invention is entitled to a reward proportionate to the benefit that he confers upon the community at large. We say, advisedly, "entitled," because it by no means follows that he obtains his deserts. In fact the lot of the inventor is generally a hard one, as the history of most of our great discoverers will testify. The world soothes its conscience by recognising a man's claims—and lets him starve in the meantime.

The Patent Laws have done much in the direction of justice by securing to an inventor the opportunity of recouping himself for his expenditure of time, thought, or money; and so long as only real inventors, and real inventions are in question, there can be no doubt as to the wholesomeness of their operations. But, like all good and useful institutions, the Patent Laws are open to abuse, and, as they at present stand, may be made to offer a premium to a class of men whose extermination, rather than encouragement, should be the object of the State. We refer to those men who rush to the Patent Office with vaguely worded specifications, comprising an abundance of indefinite claims, and drawn up in such a manner as to include as many as possible of the future allied inventions or improvements which the crafty patentee though unable to discover or define himself, is yet astute enough to see looming in the vista before him. A man, for example, patents a method of dealing with the waste acid chloride of iron liquors from pickling. His process involves concentration, and this operation he performs in "a suitable vessel." A suitable vessel forsooth! The real invention would be the discovery of the "suitable vessel," but, as the Patent Laws now stand, the reward of such invention would probably fall to the originator individual, whose speciously worded specification was a snare so to say, cunningly set for the capture of this "suitable vessel," when someone else should discover it. Or, to take another example, it is well known, that the constitution of certain series of chemical compounds is arranged upon well defined lines, so that from the composition and characteristics of known members of the series, very correct inferences can be drawn with regard to the members that are, as yet, unknown. Here is a very fertile field for him who would reap where he has not sown. What is more likely to turn out a lucrative investment than a few guineas spent in patenting the use or manufacture of some of the "missing links?"

As our readers may gather from our opening remarks, we have great respect for the Patent Laws, but we would subject them to a very vigorous amendment. When a man applies for a patent, we would compel him to state, in plain and unmistakable language, what he demands a patent for. Ambiguous claims we would reject entirely, and we would make it impossible for the ignorance of one inventor, to invalidate the discoveries of another, as is often the case now. We understand that strong efforts are being made to secure a very radical reform, and we wish the promoters of the movement every success.

matter of the trimming is. The plaintiff has made arrangements with the captains of vessels, brokers, or captains or owners of vessels that have been employed to take this pitch. He has entered into arrangements with them, that he shall have the perquisite or benefit of trimming cargoes. Now, the actual cost of trimming the cargoes is proved by Jones to be 2d. It is said there were some baskets and shovels or pickaxes or something that had to be provided, but substantially we can put it at 2d. a ton. It is said that Beckton does it for 2½d. When Beckton does it for 2½d., I suppose there is a profit on it. So far, the price of Beckton would seem to support the story of Jones, that the man who does it gets 2d. a ton for doing it. That would be taken to be the proper cost of the labour employed in trimming the cargo. Beckton does it for 2½d. Mr. Leonard, who is a person, if I may say so, in the same position as that of Beckton—he is a seller of pitch—evidently wished to have the advantage. It is more convenient, and there is more profit in doing it yourself, and therefore he was desirous of having it done by himself. They do not care to have it done by other people if they can get the advantage and have the convenience of doing it themselves. We can suppose the feeling exercised by Mr. Leonard would be the feeling generally entertained by sellers of these goods. The plaintiff, who was a clerk of Mr. Dasnieres', and who was bound to give him all his time and do the best he possibly could for his interests—without consulting Mr. Dasnieres or mentioning the subject to him, seems for some years to have undertaken this duty upon himself, not charging 2d., so far as I understand, not always charging 2½d., but sometimes 3d. and 3½d., and one lad who was called says he knows of one case where 4d. was charged, and between 4d. and 2½d., the Beckton price, there is what I may call a considerable proportion. It is a large proportion of the total, 1½d. or 2½d. is a considerable difference on that small sum of money, and I daresay on a thousand tons that is worthy of consideration. It is stated, and it is for you to judge, that this is against the interests of Mr. Dasnieres.

There is one thing that is perfectly clear, it is not done with the knowledge of Mr. Dasnieres. He is not told of it. There is no entry in his books. There is no mention of it to him, although it may have been known to two or three lads who were in his office, but he does not know it until he is told by Mr. Leonard, who makes a ground of complaint about it.

It is stated that this is prejudicial to the interests of Mr. Dasnieres, because it may affect his freights. Mr. Dasnieres was entitled to rely upon the plaintiff to get the freights as low as possible. It is all very well to say that Mr. Dasnieres, having been in London, ought to know what freights are, but freights constantly vary, and freights are not precisely certain. Freights are what can be obtained by bargaining and haggling on one side and the other, and if a captain knows that "I have got to allow to the clerk in the office a bigger price for trimming the cargo than I should have to pay for getting it done myself by the Beckton people, or Leonard, the people who sell the cargo, or whoever the people may be"—if he thought he would have to pay more in dealing with Dasnieres, it is natural that he might be a little stiffer on the question of freight, and that would prejudice Dasnieres.

On the other hand, it is said—"Oh, no, the freights are communicated to Dasnieres, and he need not accept them." That is very true. Dasnieres is in Paris; he cannot tell to what extent further coaxing might get 2d. or 2½d., or whatever it is per ton off the freight of this stuff. He cannot tell exactly. He is entitled to rely on his manager, and if he does not suspect his manager is getting anything—I will not say out of the freight, but out of trimming the cargo—he naturally trusts him, and thinks the manager has done the best he can, and therefore he may accept freights which might have been pressed lower down if the captain had known that he was to get the trimming done at a lower price.

It does certainly seem to be inconsistent with the duty of a servant, without the knowledge of his master, to be taking advantages of this description, and that it may more or less trouble him in dealing with captains and obtaining the best freights that he ought to obtain.

(To be concluded.)

A NEW PROCESS IN GLASS BOTTLE BLOWING.

THE Manchester Glass Bottle Company have introduced a new process for the manufacture of bottles, which, it is claimed, not only dispenses with the bottle finisher, but enables 25 per cent. more work to be done with the reduced gang, and at the same time renders breakages less frequent owing to dispensing with the handling occasioned by a boy passing the bottles from the blowers to the finishers. The mould or stamp of the old process is taken pretty much as it stands, and to it is fitted a collar with a knife cutting-edge at the extreme top. The service performed by the collar in conjunction with a corresponding plug with a similar knife cutting-edge immediately

above it is to execute the work formerly done by the finisher. The operation is performed by pedal pressure with the utmost accuracy and neatness, and the bottle is then ready for what is called in the new process glazing, and which imparts a higher finish to the lips of the bottle than was possible under the old system. The apparatus includes a sort of invertible iron box or cage, which holds the bottle mouth downwards over a Bunsen burner while a smooth gloss is being given to that part. The manual work entailed is performed by a boy. One great difficulty the enterprising inventor has had to encounter was to simplify the parts of the machine, so that on changing at a few minutes' notice from making one class of bottle to another, the bottle blower may adjust the machine by the screwing and unscrewing of two or three nuts. In this he seems to have arrived at a point of perfection. Owing to the cheapness of Continental labour, the bottle-making firm on the Continent have had pretty much of a monopoly all over the world, the United Kingdom included, in certain of the smaller kinds of bottles used for patent medicines and the like. The Manchester Glass Bottle Company assert that when once they have got thoroughly to work this will be the case no longer, as they will be able to turn out their wares at a price which the Continental makers will not be able to touch.

HOW PUBLIC ANALYSTS ARE APPOINTED.

THERE was considerable interest shown in the appointment of a public analyst by the Vestry of Clerkenwell at their meeting on May 8—a good whip up of members below, and a gallery full of evidently professional gentlemen. Mr. F. G. Scheib (churchwarden) was in the chair, and, in introducing the subject, called upon the clerk (Mr. R. Paget) to read the following letter:—

2, Fisher Street, Red Lion Square,

R. Paget, Esq., Vestry Clerk.

April 29, 1890.

DEAR SIR,—When you informed me that your Vestry had not re-elected me as their public analyst, but were opening the appointment to other gentlemen, I, of course, considered that my name would be submitted as an intending candidate for the vacant position. Understanding that it was omitted at the last meeting, I now ask that it may be placed upon the list, as I am willing to continue to serve the Vestry in this very important and responsible position.

T. REDWOOD.

Mr. Kelly said the name of Dr. Redwood was before the Vestry at the last meeting. Mr. Ross: And he is now too late in his application. Let's have a young man. Mr. Walton: Surely you will try to be fair to a man who has served you well in years gone by. I shall move that Dr. Redwood's name be added to the list. Mr. Putterill seconded, on the ground of Dr. Redwood's claims as an old officer of the board. Mr. Ross: Professions are overstocked unfortunately; and, when old men have held appointments for a long time, they should make way for young ones. Mr. Atkinson submitted that the Vestry would be doing a very unjust thing if they did not allow Dr. Redwood to be a candidate simply because he had not sent formal application in time. A vote was taken, with a large majority against Dr. Redwood. Mr. Ross: Now let's vote for a Clerkenwell man. Mr. Walton: We don't want Clerkenwell men. We don't want an analyst close to our doors. Mr. Ross (ironically): Of course I didn't look at it in that way. I thought we were going to have an honest man. The following names were then submitted to the vote:—

Mr. Wm. Chattaway, F.I.C., A.S.P.A., member of Pharmaceutical Society, and member of Chemical Industry.

Mr. J. K. Colwell, Ass. I.C., A.S.P.A., Public Analyst for Bedford; is in charge of St. Marybone Laboratory.

Mr. C. H. Cribb, B.Sc. (Lond.), F.C.S., F.I.C., M.S.P.A., Public Analyst for Strand district.

Mr. W. Johnson, F.I.C., F.C.S., F.G.S., M.S.P.A., and Society of Chemical Industry.

Mr. J. P. Laws, F.I.C., F.C.S.

Mr. A. P. Luff, M.D., B.Sc. (Lond.) M.R.C.P. M.R.C.S., L.S.A., F.I.C. F.C.S.

Mr. A. W. Stokes, F.I.C., F.C.S., M.S.P.A., Public Analyst for Paddington and St. Luke's.

Mr. J. Wilkie, F.C.S., M.C.S.

There were 31 votes in favour of Mr. Colwell, and not half-a-dozen each recorded in favour of the other candidates. Mr. Colwell was consequently declared elected, and called before the board to receive his appointment. Mr. Colwell said he thanked the board for the honour, and would endeavour to do his duty as well as he possibly could. He was a young man, and therefore should use all his exertions to merit the confidence bestowed. With regard to the word "jobbery," which he had heard a member apply to the matter—Mr. Walton: I protest! This gentleman is not a member of the board. Mr. Ross: No; he was in the ratepayers' gallery, but is supposed not to have heard what was said in debate. (Laughter.) Mr. Kelly: I am told that Mr. Walton says it is a planned job. I never saw Mr. Colwell in my life until last Tuesday; but he is a capital fellow, and I am glad he has the appointment. Mr. Ross: I voted for him because he is a Clerkenwell, and has all the qualifications for the appointment. Mr. Colwell then retired, and the next business was proceeded with.

UTILIZATION OF WASTE IN GLUE MANUFACTURE.

Manufacture of leather, in these days of keen competition, *Oil, Paint, and Drug Reporter*, cannot be too strictly the principles of economy; first, because the process, watched and well regulated right the way through, a loss to the tanner of no inconsiderable amount, which, add to his profits a large item. There are so many in this industry of leather manufacture by which loss may behove every tanner and those connected with the trade means to improve upon their present methods, and to their present resources. For it must be borne in mind that the sole of the process, from beginning to end, is chiefly of a nature; and, considering that this view has only recently been made. However, some of the principal processes, the extracting of the tannin, &c., from the hides, the necessity of removing the lime from the hides, and the prevention of fermentation both in the tannin liquors, and the utilization of waste. This last anyone who will undertake the trouble of studying it, the manufacture of glue, gelatine, and similar substances, is an important position in our industries, and the demand for it, both for the arts and for other purposes. The tanner is the very man who should utilize his resources, seeing that he has most of the material at his command, why not turn them to his own account, instead of sending them away? No man is in a much better position than he, already at hand innumerable scraps of hide, the skin, and sheep, and very often skins that are fit for no other purpose except stock, besides the skins of such animals as the rabbit, its fur, scraps of parchment, pieces and roundings from old leather, and many other parts, which often have the value of being worse than useless. All these he may turn to his own advantage. Now, we have it from the best that glue does not pre-exist in the hides and skins of animals under abnormal conditions, as when suffering from disease, but is brought about by a variety of circumstances, and the product of one simple process, as many suppose. The matter, then, is the matter of substance derived from various animal sources, when such substances are boiled with water, and it is the boiling of the hide, the boiling of it down, and then in finally the jelly obtained, where the art lies, and all the operations they are conducted, tend greatly to alter the quantity, the value of the glue which is obtained. For instance, the glue obtained from a fresh green hide will be very different from that obtained from hides which have been both limed and dried, the latter which is obtained after boiling differs entirely from the former which is obtained when that jelly is dried, as well as differing in a glue solution. So that the process of the manufacture of glue is the result of a combination of conditions. The material, or the animal skin from which we obtain glue, is divided into two parts—the upper layer, termed the epidermis, which is a glue-making material, and the under layer, or dermis, which constitutes the true skin, and it is this we require for glue manufacture. The portions of fat and flesh which often adhere to this, and the adipose tissue, are also entirely useless, and must be removed before we proceed. All the animal trimmings are used as the heads, the ragged edges, the ears, the tails, feet, &c. It must also be borne in mind that the older the animal the better will be the quality of the glue obtained. It is therefore better to keep the pieces of ox by themselves, as well as the sheep by themselves, and the pieces of hog, hare, and rabbit by themselves, and to give a separate boiling to each lot, as the animal, the less solid the glue. Thus different qualities of glue, which renders them more especially fit for certain uses and for certain classes of trade. The size is used in the manufacture of paper, whilst the glue may be used by carpenters, and in numerous other manufactures.

Composition of glue.—Glue is composed of :—

	Per cent.
Carbon	49.1
Hydrogen	6.5
Nitrogen	18.3
Oxygen and sulphur	26.1

The position of it makes it nearly analogous to that skin; in its modifications of isinglass, jelly, crude glue, &c., are very many to really have the same chemical composition, but very different physical characters, just the same as with the starches and

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

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JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-water Heater. Makers also of Multiple Effect Stills, and Water-Softening Apparatus.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

MANUFACTURE OF "COMPRESSED YEAST."

IN a thesis presented to the school of pharmacy of the University of Wisconsin, Mr. Alfred J. M. Lasche describes how compressed yeast is made in various parts of the United States. The thesis is printed in the *Pharmaceutische Rundschau* of New York. In regard to the preparation of the mash, it is stated that 3,130 lb. of ground corn are mixed with 4,500 gallons of water. This mixture is heated to 190° F. (to swell the starch, and thereby facilitate its inversion) and subsequently cooled to 154° F., then 1,920 lb. of ground rye and 550 lb. of ground malt are added, the malt being specially employed for the amount of diastase it contains, and is indispensable in the converting process. This mixture is then allowed to stand one hour, and is finally cooled to 80° F. The proportions of the different grains are of course largely a matter of opinion, and the various yeast manufacturers have different working formulas.

When the mash has cooled to 80° F. it is drawn off into another tub, and one gallon of concentrated sulphuric acid is added, in order to dissolve all remaining starch, dextrin, and glutinous matter, and to convert them into grape sugar. Finally, a quantity of compressed yeast is added to start the fermentation. This yeast settles to the bottom of the tub, but as soon as fermentation has started (usually in half an hour), and carbonic acid is being generated, the current of the latter gradually carries the yeast to the top of the liquid. It remains there, covered by a layer of the chaffy parts of the grain, until the yeast has accumulated in a sufficiently large quantity, and the current of carbonic acid has become strong enough, when it eventually breaks this film of chaffy particles, and collects on top of it in the form of foam. This goes on until all the nutritive matter has been assimilated. The foam, containing all the yeast, rises about two feet above the top of the liquid, dependent on the size of the tub, and when no more effervescence is noticeable, fermentation is complete.

Immediately after fermentation has ceased the foam is drawn off by means of troughs, and run, together with a fresh supply of water, into a revolving, six-sided and declining cylinder, lined with a sufficiently fine strainer. During this step of the process nearly all the chaffy remnants of the grain are separated, and the liquid, containing the yeast plant in suspension, is allowed to flow into a basin, whence, by means of a trough, it finally flows into a large tub.

The product in this tub is prevented from further fermentation by the addition of a sufficient quantity of ice. The yeast is now allowed

to settle, the supernatant liquid drawn off, and the residue repeatedly washed to free it from all mechanical impurities.

When sufficiently cleansed, it is run into a press by means of a pump. The press is constructed of a column of iron frames, sides of each frame being covered with a very fine straining cloth, all the parts fitting tightly into each other. The yeast having been pumped into such a press, the water is separated from it by means of the strainer, and carried off through a waste pipe.

The yeast, now compressed, is taken out in the form of large cakes, and in this condition it is brought into commerce.

ANOTHER YEAR WITH FUEL GAS.*

ONE year ago it was my privilege to present to this association a paper on "Fuel Gas," and to-day I am called upon by my worthy secretary to renew this subject.

Many of you, no doubt, have heard at the various association meetings, or read in our gas journals, a great many papers and articles on this subject during the past year. Some of them have been of an encouraging nature, while others—and I might say the most of them have been decidedly the other extreme. But if you stop to consider the moment you will remember that the words "assume," "if," "theoretically" occur at frequent intervals. No doubt the writers have given the subject much careful thought and study, but who can you tell by theorizing what will occur in practice?

I could monopolize your time for hours on the theoretical possibilities of fuel gas, but that does not satisfy. Facts are what we want—demonstrated by actual results; and until such facts can be presented beyond all possibility of doubt, few gas managers would care to venture in a business way, into the unknown; few would care to run the risk of success or failure judging of the conditions from a theoretical standpoint.

There is no longer any necessity to theorize. There is no longer any reason to doubt, for seventy miles from this city there is a fuel gas plant in operation, doing a business that ought to convince the most sceptical. A plant that is not of the mushroom order, but is built to stay, and is second to none of its size in the country in mechanical appliances for reducing labour to the minimum.

It is somewhat alarming to contemplate the erection of a fuel gas plant, looking at it from the standpoint taken by Mr. John Young in his recent paper read before the American Association. But a few estimates are taken and his conclusions drawn from his experience in the sale and delivery of natural gas, I am not surprised at the figures. In fact, I can easily credit the statements since I made a personal investigation of the appliance in use at Alleghany. No attempts have been made, that I could ascertain, to use the gas economically. Coal stoves and furnaces filled with broken brick and the gas attached thereto were in universal use. Under such conditions, it is to be wondered at that such vast volumes of gas are required, and that fluctuations in demand should exist? As an illustration of the differences that proper appliances make in the consumption of gas, I give you the figures of gas consumed by two houses, one fitted with a gas furnace and the other with the gas attached to an ordinary coal furnace filled with brick. The former is a 14-roomed house, was warmed throughout during the winter months with an average consumption of 39,000 cubic feet per month. The latter was a 10-room house, and required a consumption of 125,000 cubic feet per month.

In the manufacture and sale of illuminating gas the whole distribution occurs in practically four hours of each day, and necessitates a storage capacity at least equal to the output, or a manufacturing capacity equal to three times the output if the storage be reduced one-half. The mains also have to be of sufficient size to supply the entire daily output in practically four hours.

Is it not plain to be seen that certain mains supplying a given quantity of illuminating gas, would, if used to supply fuel gas, where they are used thirteen hours each day, distribute four and one-half times as much as the latter? Is it not consistent to claim a decrease in holder capacity in the same ratio? There is equally as wide a difference in the winter and summer output of illuminating gas, as could possibly exist in the supply of fuel gas. Mr. Young must certainly have had some standard of comparison in mind when he said that the storage capacity of a gas plant would have to be simply erroneous. But he certainly cannot have used the supply of illuminating gas as a comparison to draw his conclusions from. My daily record shows no such erratic demand as Mr. Young assumes must exist. He is generous enough to concede the possibility of getting 30,000 cubic feet of fuel gas from a ton of bituminous coal, while the facts are, we are getting 50,000 cubic feet and have every reason to expect 50,000 from improvements now in process of construction.

* Paper read by Charles H. Evans, of Jackson, Ohio, at the Toledo Meeting of the Ohio Gas Light Association.

tutes the success of any business if it is not the selling of the fact that people buy shows that there are certain gas, else why should they continue to use it? Why should continue to grow and our receipts to increase if the supply not a success? Is it necessary the gas should be in every son before it is entitled to the claim of success? Such is the impression of some gas engineers.

Some time ago to read a number of letters from managers, which were in answer to inquiries of a certain person to introduce fuel gas into the city where he resided. I was surprised to learn the opinions of some of the success of a plant, especially so in this case, because I am positive that persons in question never were in Jackson to investigate the matter, but were only too willing to cry down something they knew about.

It is to be a popular fallacy existing among a great many gas engineers, that illuminating gas has two and a half times the practical value of fuel water gas. This is probably due to the assumption of combustion of a composition of gases is the same for all elements. This fact is usually the reverse. Thus, marsh gas, which forms more than one-third of the bulk of coal gas, is three parts of weight of carbon and one part by weight of hydrogen.

In one pound of marsh gas the heat of combustion, when burned separately, is for carbon 10,914 units, for hydrogen 15,381, making a total of 26,295 units as the heat which one pound of marsh gas ought to yield. But by burning the heat evolved is only 23,616 units; hence marsh gas evolves 2,672 units per lb. less than its elements, or a 12 per cent. Another serious drawback to the practical use of the heat in the combustion of illuminating gas is due to the presence of such vast volumes of nitrogen, which of necessity is in to obtain the proper amount of oxygen. This nitrogen absorbs the heat and detracts largely from the flame temperature, but by its insidious presence it casts off into the atmosphere gases the moment a cold vessel is placed in contact with it. In fact, I can safely assert that the air dilution necessary for complete combustion of illuminating gas, detracts from its heat fully 50 per cent. This would not appear to be the specific heat of the nitrogen, which enters into the composition of the heat of the theoretical heat evolved. But this is an illustration of the difference between theory and practice. Marsh gas requires but 2.47 cubic feet of air for the perfect combustion of one cubic foot, it is slightly affected, comparatively speaking, by dilution.

It has been demonstrated the fact that illuminating gas used for heating is worth but 30 per cent. more than fuel water gas and one-half times as much.

Now the oft-trodden ground and see if there is not some possibility of making the general sale of fuel gas a success. Certainly elements of advantage in its use that ought to be preferable even at a higher cost than a solid carbonaceous

fuel, cost, labour, and inconvenience of handling a heavy gas, the fuel being capable of easy distribution. It is in a form also free from those material impurities and a large residual waste, besides impairing combustion. It is also free (if it be a purely combustible gas) from those which, in the present methods of heating, involve even in the cause last mentioned.

It is in precisely the condition to unite perfectly and in with the oxygen of the air, thus securing a thorough mixture. Hence, it gives an immediate and uniform result, and the temperature is constant.

The intense and steady heat of the flame just mentioned is obtained, and money, by presenting an even fire surface ready at all times for ignition.

It is a fire, capable of concentration upon the precise point where heat is desired, and one that is thoroughly under control, by a valve, starting, graduating or stopping the combustion.

The general cleanliness of the system, no dirt or residuals

is the decided advantage from a sanitary standpoint of gas as a combustible gas in our dwellings, instead of attempting to heat them as well, by means of the imperfect gas machines.

In the one case, the only risk arises from the possibility of the gas being detected by the sense, and having simply mechanical means to stop it; the other, it is a much more serious risk because the chemical one, consequent upon imperfect combustion, and the gas is carried into the atmosphere is likely to be frequent and may do nothing of the deoxidation of the air by contact with surfaces.

It appears to be overwhelming arguments in favour of gas, against a gross form, and it is a matter of considerable

surprise to me that every family on our line of main is not a consumer. But there is one class of people that always wait to see what their neighbour is going to do, and another class that is afraid of everything new. But, nevertheless, there are between eight and nine hundred families consuming our gas, and nine-tenths of all the business places in the city are lighted by our method of illumination. To this last feature I want to draw your special attention, for I do not believe a fuel gas business can be perfect and complete without an incandescent burner. The only one we have in use at Jackson (the Fahnehjelm) has, during the past year made such rapid strides towards perfection that to one who remembers it, when first brought before the public, the change seems marvellous. The comb has now double the life it had a year ago, and emits a beautiful straw-coloured light, that is very attractive to the public, as the fate of the now defunct Jackson Gas Light Company will testify.

A series of photometrical observations which I have made from time to time with the Fahnehjelm burner, since its improvement shows an average of 5 candle power per cubic foot of gas burned for the first 150 hours burning, and a gradual diminution, until the expiration of 250 hours, it has decreased to a shade less than three candles per cubic foot of gas consumed.

I removed four burners from a chandelier in my house that had been in use for 38 days, in the months of December and January, and had been burned at least 190 hours. A photometrical observation of the burners showed an illumination equal to 3.9 candles per cubic foot of gas burned.

One burner which costs the consumer four cents practically represents the oil that is used to carburate a thousand feet of water gas, as well as the additional amount of fuel expended in bringing to proper temperature the surface used to gasify the oil. In many places the cost of carburization by oil reaches from 25 cents to 30 cents per 1,000, and in no instance has the cost reached so low a figure as is represented by our Fahnehjelm burner.

That fuel gas has established itself in the field to stay I do not believe there is any longer need to doubt.

In answer to question following the reading of his paper, Mr. Evans said: The coal used in the gas plant at Jackson is Voughigheny nut, the coal mined at Jackson containing considerable sulphur and being little used. The furnace used in Jackson is one made specially for the gas, so that the products of combustion will go out of the chimney at the very lowest possible degree of temperature.

It costs about \$4 to heat a thousand cubic feet of space under general conditions. The cost of gas for a month, for a family of six, cooking on a four-hole stove, will be about \$1.30 if used economically. This is on a stove made for use of gas. An ordinary stove fitted for gas would consume three times as much.

The lowest rate for which Jackson fuel gas is sold is 38 cents per thousand. Mr. Evans finds by experiment and actual measurement that for room heating 20,000 cubic feet of gas is equal to one ton of coal; the difference in cost, therefore, is not great.

CROXLEY PAPER MILLS.

IN the House of Commons, last Friday, Mr. Lawson asked the President of the Local Government Board, whether he would inquire into the cause of the poisoning and pollution of the river Colne and its tributaries by the Croxley Paper Mills, near Watford, on Wednesday, May 7th, whereby private property to the value of many hundreds of pounds was destroyed; and whether he had any power to insist upon the provision of necessary apparatus whereby poisonous, noxious, or polluting liquid or matter could be dealt with so as to prevent any such injury or damage for the future; and, if so, whether he would exercise such powers in the interests of the owners, tenants, and rate-payers of the river and fisheries in the neighbourhood.

In reply, Mr. Ritchie said:—Since the notice of this question was given by the hon. member, I have communicated with the sanitary authority of the Watford Union, and I learn from their clerk that no complaint has been made to the authority, as to the occurrence on May 7th, at the Croxley Paper Mills. I am informed, however, by communications which I have received, that a tank at the mills which was charged with chloride of lime burst, the result being to poison great quantities of fish, and to affect the water for a long distance below the mills. I have no authority to insist upon the provision of necessary apparatus whereby poisonous, noxious, or polluting liquid or matter can be dealt with, so as to prevent any such injury or damage for the future. If, as I infer is the case, it is considered that the provisions of the Rivers Pollution Prevention Act are contravened, the sanitary authority are empowered, with the consent of the Local Government Board, to institute proceedings for the enforcement of that Act. If any such consent is applied for, the matter will receive my prompt consideration. In the meantime, I will bring the matter specially under the attention of the sanitary authority, and request them to investigate the facts, and report the result to the Board.

SMOKE ABATEMENT.

ON Wednesday, a public meeting was held at the Mansion-house "to promote the national work undertaken by the committee for testing smoke-preventing appliances." The Lord Mayor presided, supported by Lord Derby, Lord Howard, of Glossop, Earl Fitzwilliam, Sir F. Abel, Sir H. Roscoe, M.P., and Sir Douglas Galton; and letters, regretting their inability to attend, were received from the Duke of Westminster, Lord Rayleigh, Lord Rosebery, Lord Cross, Lord Percy, Lord Egerton of Tatton (the president of the committee), and the Mayors of Manchester, Salford, Sheffield, Nottingham, and Leicester. The chairman, in opening the proceedings, said he thought that every one must appreciate the importance of, and the necessity for the purest air we could possibly obtain. Mr. A. E. Fletcher, her Majesty's chief inspector of alkali works, and chairman of the executive of the Committee for Testing Smoke-Preventing Appliances, said the committee did not wish to recommend any particular appliance, nor did they stand forward as inventors. Lord Derby then proposed a resolution approving the objects of the committee, as stated. He thought that the diminution of smoke and its necessary accompaniment dirt, was a matter which concerned every one, except those who were fortunate enough to live away from great towns. Indifference was the real difficulty which they had to encounter, but in England, anything which came to be recognized as a want, was eventually supplied. The expenditure of fuel in creating dirt—for that was what it came to—was a waste of fuel itself, and the injury caused to property was not inconsiderable. He believed that more than three-fourths—he would say something like nine-tenths—of the smoke from collieries and factories was absolutely preventable, though some trouble and outlay would be required. Possibly more stringent legislation would be needed, but let them first try the experiment of enforcing the laws which they already had. Lord Howard of Glossop seconded, and Professor Chandler Roberts-Austen supported the resolution, which was carried unanimously. On the motion of Sir Henry Roscoe, M.P., seconded by Earl Fitzwilliam, and supported by Alderman Bowes (Salford), a resolution was next passed in favour of raising a fund to meet the expenses of the work. Mr. Ernest Hart, the Mayor of Rochdale, and Mr. T. C. Horsfall afterwards addressed the meeting, and a vote of thanks to the Lord Mayor closed the proceedings.

THE EXTENSIVE FRAUDS AT BRADFORD.

ON Wednesday, at the Crown Court, Leeds, before Mr. Justice Vaughan Williams, was concluded the case of Francis Stubbs (foreman dyer) and Harry Varley (drysalters' traveller), who were indicted for conspiring to defraud S. C. Lister and others, and also for obtaining money by false pretences. This case, which raised questions similar to those which are familiar to the public in connection with the Salford Gas frauds, created great interest, and there was a large attendance.

Mr. Lockwood, Q.C., Mr. Asquith, Q.C., and Mr. Waugh prosecuted; Mr. Waddy, Q.C., Mr. C. Matthews, and Mr. Kershaw defended Stubbs; and Sir Charles Russell, Q.C., Mr. E. T. Atkinson, Q.C., and Mr. Manisty represented Varley.

The prosecution was instituted by Messrs. Lister and Co. (Limited), silk spinners and manufacturers, Manningham, Bradford. The defendant Stubbs was for many years the foreman dyer in the velvet department of the business, and in such capacity was almost entirely responsible for the purchase of dye wares for his department, for the selection of the drysalters from whom they were procured, and it was also alleged, for the prices that were paid for them; and since 1889, at which period he had stipulated for the right to see the drysalters alone and without any interference, he had exercised absolute control. Prior to the beginning of these proceedings he had given notice of his intention to leave the employment of the prosecutors. Richard Varley, a drysalter in Leeds, supplied dye wares in considerable quantity to the velvet department, and the defendant Varley acted on behalf of his father, Richard, in the transaction of the business, and was in frequent communication with Stubbs for that purpose.

It was alleged on behalf of the prosecutors that between March 1889, and February, 1890, dye wares had been sold to the prosecuting company for their velvet department by Richard Varley, and that by arrangement between the two defendants the prices paid for them had been largely in excess of what was fair and reasonable, and that the defendant Stubbs had received large payments in consideration of obtaining such excessive prices from his employers. The total amount so received during that period in excess of what was fair and reasonable was alleged to be £1,961, and of this Stubbs got £637. The evidence was confined to allegations with regard to certain dyewares—viz.,

cutch, fustic, sumac, fast red, and an aniline blue known in the as blue oox.

SIR CHARLES RUSSELL, in addressing the jury on behalf of defendant Varley, did not deny that Stubbs had received payment by way of commission upon the business done by his department with firm his client represented, and did not defend this practice, but viewing the evidence he contended that the prosecutors had failed to prove that which was essential to the conviction of the defendants, viz., that these payments had been made and received with a fraudulent intention. He also justified the large profit derived upon the fast red and aniline blue upon the ground that the evidence established that there was no market price for these dyes, that the blue was standard article but a mixture invented by Richard Varley himself, that the sale of both blue and red was exclusively confined by Messrs. Lister. He further suggested that it was fair to infer from evidence and from the failure to call Mr. Reixach, the manager, witness, that Messrs. Lister had winked at the payments now to be condemned as criminal.

MR. WADDY followed, on behalf of Stubbs, and whilst claiming benefit of all that had been urged for Varley, pointed out to the jury that the prisoners were entitled to be acquitted unless the jury satisfied that the parties understood that the payments made were out of the pockets of Messrs. Lister and not out of the pocket of Richard Varley.

The learned JUDGE, in summing up the case to the jury, directed them that it was not necessary for them, in order to find the intent to defraud proved, to be satisfied that the defendants themselves realized the dishonesty of the act done, if the nature of the act was as to have the effect of defrauding.

The prisoners having been found guilty, Stubbs was sentenced to nine months' hard labour, and Varley three months' hard labour.

Trade Notes.

PARAFFIN AND PETROLEUM IN SERBIA.—The Servian Government has passed a Bill granting to an Anglo-German syndicate a monopoly for the working of paraffin and petroleum in Servia. The oil deposits in the neighbourhood of Alexinatz will be the first tapped.

THE FIRST LOADED PETROLEUM TANK-SHIP ON THE R.—On Saturday, the 3rd inst., a loaded tank vessel passed the havens, being the first ship of the kind seen on the Rhine. A prepared means of transport for petroleum on the Rhine thus became an accomplished fact. The honour, which otherwise would have fallen to Duisburg, is due to Mannheim. A tank vessel had been constructed at Duisburg; but owing to the objections of the authorities and of an adjoining chemical manufacturer, the vessel was to be taken to pieces to be constructed again in another place "against fire." The petroleum tank vessel now at work is called "Petrolia," and was built at the Berninghaus Yard, Duisburg, the account of the great petroleum import firm of Horstmann & Co., Rotterdam. The cargo is about 8,500 cwt. petroleum, Rotterdam to Mannheim. The petroleum is imported direct from United States in tank steamers, and either pumped from them into the Rhenish tank vessels or into reservoirs at Rotterdam. At its destination (Duisburg or Mannheim) the tank vessel discharges the petroleum into iron reservoirs, to which filling apparatus for the purpose are attached. This form of petroleum transport will much improve the railways, on which the petroleum traffic is now very large. (*Kul*)

LOCOMOTIVE COAL.—The existing contracts for the supply of motive fuel to several of the leading railway companies will expire at the end of next month, and a meeting of coalowners on the subject of the new charges for 1890 has just been held in the South Yorkshire district, which supplies steam coal by contract to several companies. As regards that district, it appears that up to the end of 1888 the contract price for locomotive coal was 6s. per ton. At the beginning of 1889 a short-time contract was conceded at 8s. per ton, and in the last of the contracts all round were raised to 8s. 6d. The Eastern district, contracting from the beginning to the end of each year, January last was charged 11s. per ton for the South Yorkshire "hards," and that is now understood to be the rate at which contracts beginning in July next will be taken, although in some districts it is likely to be even more. Taking the all-round price as 11s. per ton, the London and North-Western, it is estimated have to pay about £210,000. more for its coal in 1890-91 than in 1888, the Midland upwards of £180,000., the Great-Western less than £150,000., and the North-Eastern (which consumes 50,000 tons of coal monthly) fully £160,000.

THE ADVANTAGES OF THE APPLICATION OF LIME TO SOILS.

ALFRED DRIEBERG.

FOR improving certain kinds of soils, lime is esteemed one of the best means we possess. It is required for the growth of all kinds of cultivated plants, especially those belonging to the natural order *Leguminosae*. Therefore it is absolutely necessary that lime should be present to some degree in all cultivated soils. While lime is always present in soils that admit of cultivation, the quantity contained in them is very often insufficient for the healthy growth of certain crops. Therefore if lime be applied to such soils it naturally increases their fertility. On soils of this kind the striking effects of lime is best seen when the soil contains in abundance all the other essential elements of fertility with the exception of lime. Lime not only acts directly as a manure, but increases the other materials necessary for the growth of crops. In most cases the beneficial influence of lime is due to its chemical action in the soil. Lime preserves clay in an "open" condition, thus making heavy soils friable and pervious to water. It also promotes the decomposition of vegetable matter and the formation of nitrates. A soil whose fertility has been impaired by an excess of organic matter can be rendered fertile by a large dose of quicklime. In some soils that are infested with insects an application of lime destroys them entirely at little expense. When applied in large quantities to clay land, it opens and loosens the clay and gives it a certain amount of porosity, and as a consequence, it brings about further improvement by exposing a larger extent of surface to the action of the atmosphere. The quantity of lime applied to the soil varies with the purpose it is intended to serve. If lime is applied to destroy an excess of organic matter, a large dose will be necessary, but when a soil is naturally deficient, a far smaller dose will be sufficient. For obtaining the fullest effects of lime, small doses at short intervals are very effective. Where the opposite course is adopted there is considerable waste and a gradually diminishing effect, as the natural tendency of lime is to sink down into the subsoil. A certain quantity of lime is dissolved and removed by drainage water, and the remainder, in a few years, sinks below the cultivated depth, or chemical changes take place which render it effete. On arable land, the plough for a season or two brings it back to the surface, but after a time it gets beyond the depth of the plough and is lost. This strong tendency of lime to sink into the subsoil, shows us that when liming, we should not plough the lime in, but keep it as near the surface as possible. The land should be ploughed first, then the lime spread and simply harrowed in. Burnt lime is much more powerful in its action on vegetable matter than chalk or marl, it should be used with discrimination, lest the humus of the soil be unduly diminished. Heavy clays or soils rich in humus are those most benefited by burnt lime. In reclaiming peat-bogs, lime is of the highest value. The acid humic matter of the peat is neutralised by the lime, and the conditions are made suitable for the oxidation of the nitrogenous organic matter, and the formation of ammonia and nitrates. The general effect of lime is to render available the plant food already in the soil without itself supplying any significant amount. Vegetable remains under peculiar circumstances refuse to decay, and accumulate to an injurious extent. This kind of vegetable matter is generally found in undrained or badly drained land. To remove this sour humus, lime is generally employed, which by acting upon the insoluble vegetable matter, hastens its decay, and "sweetens the land," for by decay these materials furnish carbonic acid and other useful food-materials for plants. The lime thus converts a noxious ingredient into a source of fertility. Lime economises the use of potash; for certain crops, where potash is not abundant in the soil, have, to some extent, the power of utilizing lime in its place. Lime also improves the quality of grain, grasses, and other crops, the finer grasses on certain lands refusing to grow until the land has been limed. It hastens the maturity of crops and checks the growth of moss and weeds in the soil. The effect of lime on the mechanical texture of many soils is also great. It pulverizes and lightens strong soils, at once improving their drainage and rendering them more easily tilled. It also improves the texture of light soils—provided an overdose be not applied—even when they contain but little organic matter. The avidity of lime for moisture, added to the chemical changes brought about by it, have the effect of increasing the absorptive and retentive power of soils to a considerable degree. A deep soil requires a heavier dressing of lime than a shallow one, and deep tillage will call for larger applications than where the cultivation is shallower. A sandy soil requires less than a heavy clay, and soils poor in vegetable matter require less than soils which are rich in organic matter. A small quantity of lime will have greater effect on drained land than a larger dose on wet or undrained land. Lime slakes best and quickest when laid down in small heaps and slightly covered with fine soil. This saves refilling and recarting. The heaps should be put down at equal distances apart, so that when the lime is slaked, it could be spread out easily. There should not be

to much magnesium carbonate present in a limestone, as it is considered less valuable for agricultural purposes. As I have said before, best to apply lime in small doses at short intervals rather than in large doses at long periods, as Darwin has shown us that the action of earthworms tends to bury it. The weight of lime per bushel varies from 75 lb. to nearly 1 cwt. according to the particular kind. The better it is burnt the lighter it is comparatively. Pure varieties of limes yield a little over 11 cwt. of burnt lime per ton. Lime should be applied as a rule to soils containing much clay or humus; not in contact with nitrogenous manures such as dung or guano, as it sets the ammonia, which is liable to escape into the air. But lime, as it sets free plant food, tends to exhaust the soil, and "lime with manure, will make both farm and farmer poor."

The following are the chemical changes which lime passes in application to land:—

- 1st CaCO_3 . Pure limestone rock, calcium carbonate before burnt.
- 2nd CaO . Lime, calcium oxide, quicklime, caustic lime, shells, as it comes from the kiln after burning.
- 3rd CaH_2O_2 . Slaked lime, calcium hydrate, fallen shells, if water has been put on it, or it has absorbed water from the atmosphere, is somewhat caustic, and usually spread on the land in this state.
- 5th CaCO_3 . Mild lime, the state to which it eventually returns after long exposure; has yielded up its water and absorbed carbon dioxide (CO_2). In this condition it is equivalent to finely powdered limestone or chalk, as it is identical in chemical composition with them.

Effect of Lime on Soils.

1. Acts with felspar or clay, setting free potash, or other alkalis.
2. Acts on vegetable matter, setting free ammonia, water, and acid, and carbon dioxide (which it unites with), tending to decompose excess of humus in the soil.
3. Neutralises organic acids—humic, ulmic, geic, &c.,—sweetening the soil.
4. Takes up nitric acid as formed by the nitrifying bacteria.
5. Is a plant food in itself.
6. Renders harmless injurious salts of copper, iron, &c.
7. Opens up clay soil from the "curdling" effect it has on molecules of that substance.

Soils which contain more than four per cent. of lime (carbonate) should not have any applied as a rule.

Loamy and clay soil contain one to three per cent. of calcium carbonate, and defective soils less than one per cent.—*Tropical Culturalist*.

Market Reports.

REPORT ON MANURE MATERIAL.

There has been a moderate business passing, both on spot and forward, at higher prices for phosphates, but without much change in nitrogenous material.

The position as regards mineral phosphates is still unchanged, large shippers being well sold a long way ahead, will not accept under 11d. per unit, C. F. & I. to U. K., for cargoes of hot-air-dried Rock, but outside shippers are still inviting bids at less money. The sellers of Charleston Land Rock at 10d. per unit, and seller inviting offers under that price. We do not hear of any important transactions in other descriptions, but now that we are nearing the of the manure season, manufacturers seem more at liberty and inclined to consider their next season's supply of material.

There are now several cargoes of River Plate bones on the market for February and March sailing, but we do not hear of any transactions at £5 7s. 6d. asked, delivered U.K. ports, but something less is probably business. It is reported that large sales of crushed Indian bones have been made for direct shipment to U.K. port at very full prices, and at the moment there are buyers at £4 17s. 6d. per unit, Liverpool, May and June steamer shipment, but no seller at the price. Spot has been cleared, and there are many enquiries rather dirty parcel of uncrushed Brazils, sold on Wednesday at £4 12s. 6d., ex-quay Liverpool, which is quite 5s. up from the last point touched. Sales of East Indian bone meal continue to be at £5 10s., ex-quay or store Liverpool, and we understand the shipment ahead, £5 5s. has been bid and refused for quantity. Shippers having been caught last year, seem very shy about committing themselves to large sales this year, unless at prices quite out of reach of buyers.

Nitrate of soda is quiet at 8s. per cwt. on spot. Due cargoes worth barely 8s.; May and June sailings are worth about 8s. 3d. and September, October, and November, about 8s. 7½d. to 8s.

Dried blood is more enquired for, without alteration in value.

ed; 60 tons of rough River Plate sold at 10s. per unit ex-
cool.

sellers of ground hoof and horn at 9s. per unit, delivered
ks, in bags, gross weights, but not much demand just now
le.

quiet at 40s.

phates are again a shade easier, and 46s. 3d. in bulk for-
ks, may be taken as nearest value of 26%.

TAR AND AMMONIA PRODUCTS.

's prices stand good for benzols to-day, and there is an air
about the market that was wanting when we wrote last
rt. Solvent naphtha is still quoted at 1s. 9d. Anthracene
ite nominal at 1s. 5d.; 30% B can be bought at 1s.
ate of ammonia market is somewhat quieter, and prices
slightly. £11. 5s. to £11 6s. 3d. may be taken as the
don, Hull, and Leith. The Beckton quotation is £11. 10s.

CELLANEOUS CHEMICAL MARKET.

out little change to report in the position of the alkali trade
past week. Caustic soda has slightly recovered from the
ression, and there has been more business doing in 70% at
l. to £8. f.o.b. Liverpool; 60% at £7. 2s. 6d.; cream
per ton. For the higher strengths: 74% is value for
l. f.o.b. Liverpool; while 77% on the Tyne is at £9. 15s.
b. at that port. Soda ash is maintained in price at 1½ per
ling brands, but there is less strength in the position for
ries. According to quantity and period of delivery prices
½d. to 1½ for carb. ash 48% to 58%; and for caustic
1½d. per deg. Chlorate of potash is slightly better at
Soda crystals are well sustained at £3. to £3. 5s.,
package. Saltcake in bulk 25s. to 26s. per ton. Vitriol
ful, and prices easier. Muriatic acid without change.
owder remains steady, at £5. per ton on rails and £5.
o. in export casks. Sulphate of copper firmer, with recent
netal, and speculative business for forward deliveries has
ed to some extent from this cause. Prompt price is £26.
l June to September £23 10s. per ton. White powdered
inding ready outlet, and prices are firmly maintained.
d acetic acids stationary in value, and business in this
the whole, is dull. Carbolic acid crystals are rather
¾d. to 8d. for 34° for early deliveries; but the outlook
afford any distinct encouragement to makers. Lead salts
l there is more inquiry. Muriate of ammonia is slightly
n home and export trades. Potash, caustic, and carbonate
with fair demand, and are firm in prices both for early
deliveries. Citric and tartaric acids remain steady in
lic acid 3¾d. to 4d. per lb. There is no improvement
the demand for chemicals from the textile manufacturing

THE TYNE CHEMICAL REPORT.

TUESDAY.

on the whole, are much steadier this week. There has
advance in the price of soda ash and soda crystals, the
two and a half per cent., and the latter, one shilling per
an last week. Bleaching powder and sulphate of soda
l, without any change in prices. Caustic soda is
ve shillings per ton, but the market closes steady,
better demand. To-days market prices are:—Bleaching
softwood casks, £5. to £5. 2s. 6d. per ton;
77%, in drums, £9. 5s. per ton, ground in 3-4 cwt.
soda ash, 48/52%, 1¼d. per degree less 2½%; soda
wt. bags, net weight, £2. 15s. per ton, in 2 cwt. bags,
2. 12s. 6d. per ton; in casks, gross weight, £2. 12s. 6d.
hate of soda, in bulk, 32s. per ton; ground and packed in
ton; recovered sulphur, £4. 5s. per ton; chlorate of
per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100°
id. per ton; 140° Tw., £4. per ton; hyposulphite of soda,
£5. 15s. per ton, in 5-7 cwt. casks, £5. 5s. per
ite sulphate of alumina, £4. 10s. per ton; blanc fixe,
ton; chloride of barium, £8. per ton; nitrate of baryta,

crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of
barium, £5. 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

There is no change to report in the price of small coals for man-
facturing purposes. Northumberland steam in good demand, at prices
ranging from 8s. to 8s. 6d. per ton. Durham small, quoted, 9s. 6d.
to 10s. per ton.

METAL MARKET REPORT.

	Last week.		This week
Iron	44/6	....	44/2½
Tin	£93 5 0	....	£94 12 6
Copper	52 5 0	....	52 17 6
Spelter	23 0 0	....	23 5 0
Lead	12 17 6	....	12 17 6
Silver	47¼d.	....	47½d.

COPPER MINING SHARES.

	Last week.		This week.
Rio Tinto	18½ 18½	....	19 19½
Mason & Barry	7½ 7½	....	7½ 7½
Tharsis	5½ 5½	....	5½ 5½
Cape Copper Co. ..	4½ 4½	....	4½ 4½
Namaqua	2½ 3	....	2½ 3
Copapo	2½ 2½	....	2½ 2½
Panulcillo	1 1½	....	1½ 1½
Libiola	2½ 2½	....	2½ 2½
New Quebrada	½ ¾	....	....
Tocopilla	1/- 1/6	....	....
Argentella	3d. 9d.	....	3d. 9d.

THE LIVERPOOL COLOUR MARKET.

COLOURS without change. Ochres: Oxfordshire quoted at £10.,
£12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh,
best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish,
Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C.,
65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.;
Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead,
£18. Oxide of zinc: V.M. No. 1, £25; V.M. No. 2, £23.
Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black,
9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra
Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24; ditto
for jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron,
prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d.
per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Sulphate of ammonia, which was on the rising grade last week at a
good £11. 5s., stiffened steadily, for spot delivery, till £11. 7s. 6d.
was topped at the close of last week and the beginning of this. To-
day it feels as if the edge was just off this ascent, and probably the
full £11. 7s. 6d. is no longer readily procurable; but, the article is,
nevertheless, healthy, and no one as yet looks for much of a drop,
while another and immediate rally would not excite surprise. For
delivery forward, over July to September, £11. 12s. 6d. is said to have
been done; but this is doubtful, and the forward market is essentially
barren of authenticated results for the moment, owing to the inde-
pendent attitude of makers. Chemicals generally still incline to the
fall here, and caustics have encountered a further considerable drop in
all strengths except the highest. Bleach also is a little cheaper, but
with a good show of put through business for the week; and
chlorate of potash is another eighth down. As an exception, soda
crystals rise, and now quote 52s., if not more. Bichromates are in
very weak demand, but paraffins (except burning oil) retain positions
well. Wax and scale in dealers hands are fetching a fraction over stop
prices as below, but makers, for the most part, work on old un-
exhausted contracts concluded on these terms. Chief prices current
are:—Soda crystals, 52s. net Tyne; alum in lump £5., less 2½%
Glasgow; borax, English refined, £29., and boracic acid, £37. 10s.
net Glasgow; soda ash, 1¼d. less 5%, Tyne; caustic soda, white,
76°, £10., 70/72°, £7. 15s., 60/62° £7. 2s. 6d., and cream, 60/62°
£6. 17s. 6d., all less 2½% Liverpool; bicarbonate of soda, 5 cwt.
casks, £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined
alkali, 48/52°, 1¼d. less 1¼%, Tyne; saltcake, 25s. to 26s.;
bleaching powder, £5. 2s. 6d. to £5. 5s. less 5% f.o.r. Glasgow; bichro-

mate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. to 8s. 1½d.; sulphate of ammonia, spot, £11. 6s. 3d. to £11. 7s. 6d. f.o.b. Leith; salammioniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £25. less 5% Liverpool; paraffin scale, hard and soft, 2½d. per lb.; paraffin wax, 120°, semi-refined, 3½d.; paraffin spirit (naphtha), 8d. a gallon; paraffin oil (burning), 6¼d. to 7d. on rails Glasgow to all Scotch buyers (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 15s. to £8. Week's imports of sugar at Greenock were 18,101 bags.

THE LIVERPOOL MINERAL MARKET.

Our market has ruled steady during the past week. Manganese: Arrivals very small; prices continue firm. Magnesite: There is little demand for raw lump, whilst the production has very much increased; prices, therefore, are in the hands of buyers, and sales can be made at lower prices than any time previously. Rav ground, £6. 10s.; and calcined ground, £10. to £11. Bauxite (Irish Hill brand) continues in increasingly strong demand, bringing tip-top prices—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: The only arrivals this week have been of G.G.B. "Angel-White" brand, which sells freely at full prices i.e., 95s. to 100s. medium, 105s. to 110s. superfine. Barytes (carbonate), easy; selected crystal lump scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground, £6.; and selected crystal ground, £8. Sulphate has somewhat improved, best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., and specially selected lump, finest quality, £13. Iron ore steady. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland easier, 14s. to 18s. Purple ore quiet. Spanish manganiferous ore continues in fair demand. Emery-stone: Best brands still scarce, especially on spot: prices unaltered. No 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal further inquired for. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore: steadier, prices unaltered. Antimony ore and metal have further advanced. Uranium oxide, 24s. to 26s. Asbestos scarce, bringing increased prices. Potter's lead ore continues firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues easier on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel easier. Chrome iron, 20 per cent., £24. to £25. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

New Companies.

AFRICAN PETROLEUM EXPLORATION SYNDICATE, LIMITED.—This syndicate was registered on the 10th inst., with a capital of £10,000., in £1. shares, to acquire lands, concessions, mining and oil rights, and real and personal property in South Africa, and to carry on business as oil merchants. The subscribers are:—

	Shares.
R. Gudridge, 19, Sussex-street, Poplar, clerk	1
F. Vigo, 93, Earl's-court-road	1
A. Burnie, 165, Fenchurch-street, solicitor	1
J. J. Allen, 6, Stafford-road, Brixton	1
E. T. Bull, 12, Edinham-street	1
Wm. Young, 7, Vicarage-road, Camberwell	1
A. W. Heron Maxwell, 56, St. James's street, S.W., secretary to a company	1

METROPOLITAN CEMENT AND BRICK WORKS, LIMITED.—This company was registered on the 13th inst., with a capital of £10,000., in £1. shares, to carry on business as cement and brick manufacturers. The subscribers are:—

	Shares.
H. Tapp, M.E., 20, Bucklersbury	1
F. Mortlemann, 71, Fenwick-road, East Dulwich, clerk	1
G. H. Taperell, Harewood, Chingford	1
F. Wingrove, 8, St. Paul's crescent, N., commission agent	1
H. Emery Fuller, 13 and 15, Leadenhall-buildings	1
W. Browne, 16, Craigmillar-road, Edinburgh, medical practitioner	1
G. R. Poole, 17, Brooke-road, Wood-green	1

MONARCH SOAP COMPANY, LIMITED.—This company was registered on the 13th inst., with a capital of £2,000., in £1. shares, to trade as soap, chemicals and varnish manufacturers. The subscribers are:—

W. Minchin, 38, Great St. Helens, soap maker	1
A. A. Coster, Junior Carlton Club	1
H. H. Hughes, 44, The Grove, Hammersmith	1
F. Minchin, 14, Grace-street, Bromley-by-Bow	1
E. E. Johnson, 110, Cannon-street, accountant	1
R. Kurtz, Carshalton, Surrey	1
F. W. Heather, 5, Pump-court, Temple, barrister	1

SAN FRANCISCO BREWERIES, LIMITED.—This company was registered on the 13th inst., with a capital of £1,000,000., in £10. shares, to trade as brewers, maltsters, etc., and for such purposes to adopt an unregistered agreement with F. Lenon and C. E. Ertz. The subscribers are:—

T. Willerson, 7, Nightingale-road, Clapton, accountant	1
F. W. Hull, 68, Disraeli-road, Putney, accountant	1
R. Gordon, New Malden	1
H. J. Bass, 10, Rodney-terrace, Putney, factory manager	1
E. E. Friend, 8, Larcom-street, S.E., merchant	1
J. Kelly, 8, Gladstone-terrace, S.W., merchant	1
G. A. Buckler, Pembroke-road, South Tottenham	1

Gazette Notices.

Partnerships Dissolved.

H. Moss and T. M. BROUGHTON, under the style of Moss, Broughton & Lawson-street, Great Dover-street, Southwark, London, Mechanical Electrical Engineers.
S. S. FEWINGS and O. P. TRAHERNE, under the style of S. S. Fewings and Seaton, Mineral Water Manufacturers.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis, Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Fire-Lighting and Fuel. W. Gordon and G. A. Newton. 6,900. May 1.
Non-Conducting Composition. F. W. Moore. 6,905. May 5.
Brick Making Machinery. T. C. Fawcett. 6,914. May 5.
Fuel-Compressing Machinery. H. G. Holborow. 6,919. May 5.
Electric Batteries. H. T. Eagar and R. P. Milburn. 6,924. May 5.
Air Compressors. S. E. Martyn. 6,928. May 5.
Manufacture of Colouring Matters. C. D. Abel. 6,931. May 5.
do. do. do. 6,932. May 5.
Extraction of Gold from Ores. G. Bamberg. 6,936. May 5.
Electrical Switch. J. Appleton. 6,945. May 5.
Basic Blue Colouring Matters. S. Pitt. 6,946. May 5.
Lining of Pulp Boilers. C. Kellner. 6,951. May 6.
Coating Metals with Cement. C. Kellner. 6,952. May 6.
Preventing Incrustation in Steam Boilers.—(Complete Specification).
Draper, A. Holmgren, H. R. Mount, and J. Barnes. 6,955. May 6.
Carbonising. J. Horne. 6,966. May 6.
Manufacture of Paper Pulp.—(Complete Specification). C. Kellner. May 6.
Disintegrating Apparatus. P. U. Askham and W. Wilson. 7,009. May 6.
Manufacture of Indigo. W. Cole. 7,018. May 6.
Manufacture of Soap. C. A. Serra. 7,019. May 6.
Making Fibrous Material Impervious to Water.—(Complete Specification). A. J. Boulton. 7,024. May 6.
Carburetors.—(Complete Specification). J. J. Cooper. 7,040. May 6.
Treatment of Ores Containing Copper, Nickel, and Cobalt. A. S. 7,055. May 6.
Liquefying and Storing Chlorine. J. Y. John. 7,058. May 6.
Corburetted Water-Gas. H. Fourness. 7,063. May 7.
Filtering Apparatus. B. Hunt and W. McD. Mackey. 7,075. May 7.
Fermentation of Amylaceous Matter. A. J. Boulton. 7,098. May 7.
Brick Kilns. B. F. McTear. 7,099. May 7.
Manufacture of Soap. H. Scott. 7,117. May 7.
Electric Meters. O. Romanze, W. Weise, and F. W. White. 7,125. May 7.
Reduction of Iron from its Ores. J. D. Danton. 7,129. May 7.
Water Softening Apparatus. W. Lawrence. 7,138. May 7.
Employment of Silicic Acid for Decolourizing Oils. H. Stern. 7,142. May 7.
Smokeless Fire Lighters. T. Williams. 7,144. May 7.
Glass Bottle Making Machinery. D. Rylands. 7,145. May 8.
Smoke Prevention. T. G. Hardie. 7,162. May 8.
Manufacture of Paper. E. Partington. 7,163. May 8.
Drying Sludge. F. N. Mackay. 7,165. May 8.
Feed-Water Heaters. D. B. Moirson. 7,167. May 8.
Manufacture of Gas Retorts and other Clay Ware. C. H. Edwards. May 8.
Welding Metals by Electricity.—(Complete Specification). W. P. Thomp. 7,185. May 8.
Welding Metals by Electricity.—(Complete Specification). W. P. Thomp. 7,186. May 8.
Bleaching Textile Fibres. W. H. Spencer. 7,198. May 8.
Dyeing Wool. P. Cavaillès. 7,202. May 8.
Electric Meter. J. Perry. 7,219. May 9.
Enamelling Metals. J. King. 7,220. May 9.
Oil Filter.—(Complete Specification). C. A. Kellner. 7,229. May 9.
Rust Prevention Composition. L. E. A. E. D. de Liebhafner. 7,238. May 9.
Manufacture of Ammonia. H. Baudouin and P. F. Escarpit. 7,247. May 9.
Converting Iron into Steel. W. Hodge. 7,253. May 9.
Obtaining Pigments from Salts of Iron. M. N. d'Andria. 7,260. May 9.
Manufacture of Gas. G. M. Cruikshank. 7,277. May 10.
Manufacture of Explosives. C. O. Lundholm and G. H. Horsie. May 10.
Drainage and Sewerage. J. P. Bayly. 7,318. May 10.
Pots for Melting Glass. F. O. Thompson. 7,327. May 10.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

ending May 13th.

Oehlenschläger Bros.

Beresford & Co.

A. & M. Zimmermann

Phillips & Graves

Beresford & Co.

Lime—

Lister & Briggs

M. D. Co.

Pillow, Jones & Co.

L. & I. D. Jt. Co.

H. R. Merton & Co.

H. Bath & Son

H. Emanuel

French & Smith

Pillow, Jones & Co.

H. Emanuel

Quirk, Barton & Co.

Olyett & Sons

M. D. Co.

G. Soanes & Co.

Clift, Nicholson & Co.

Goald, Rigg & Co.

A. Hunter & Co.

Gonne, Croft & Co.

C. C. Bryden & Co.

Anglo-Con. G. Wks.

J. Puddy & Co.

W. C. Bacon & Co.

J. Besant

Seager, White & Co.

A. Boltz

Blundell, Spence & Co.

W. Harrison & Co.

Magee, Taylor & Co.

Leach & Co.

P. Jantzen

D. Storer & Sons, Ltd.

O'Hara & Hoar

A. Lumbeck & Co.

W. Harrison & Co.

Petri Bros.

T. Morson & Sons

H. Bath & Son

M. Ashby, Ltd.

B. & F. Wf. Co.

T. Ronaldson & Co.

Burgoyne, Burbridge & Co.

W. C. Bacon & Co.

L. & I. D. Jt. Co.

Anderson, Weber & Smith

Clarke & Smith

L. & I. D. Jt. Co.

Matheson & Co.

Kleinwort, Sons & Co.

Wallace Bros.

L. & I. D. Jt. Co.

Brown & Elmslie

J. Knight & Sons

Chemicals (otherwise undescribed)

Holland, £54 Kaltenbach & Schmitz

Germany, 59 T. H. Lee

A. & M. Zimmermann

France, 550 W. C. Bacon & Co.

Germany, 12 Elkan & Co.

A. & M. Zimmermann

Holland, 140 T. H. Lee

Germany, 278 Craven & Co.

Holland, 45 G. Rahn & Co.

Germany, 5 L. & I. D. Jt. Co.

W. Burton & Sons

Spies Bros. & Co.

Dyestuffs—

Argols

Italy, 720 pks. B. Jacob & Sons

Orchella

E. Indies, 15 E. Barber & Co.

Sumac

Italy, 400 W. France & Co.

W. Shelcott

Tannery Bark

Holland, 11 t. G. S. N. Co.

T. H. Lee

Adelaide, 77 Devitt & Hett

Baxter & Hoare

Belgium, 10 Leach & Co.

Logwood

Jamaica, 5 E. D. & F. Man.

Holland, 13 Chilworth Gunpowder Co.

Yalonia

A. Turkey, 170 t. Hicks, Nash & Co.

A. & W. Nesbitt

Indigo

E. Indies, 26 chts. L. & I. D. Jt. Co.

Benecke, Souchay & Co.

G. Croshaw & Co.

Langstaff & Co.

U. S., 13 L. & I. D. Jt. Co.

E. Indies, 29 L. & I. D. Jt. Co.

W. Isted

G. Croshaw & Co.

Elkan & Co.

Ross & Deering

61 chts. L. & I. D. Jt. Co.

W. Brandt Sons & Co.

Myrabolams

E. Indies, 350 pks. Tod, Durant & Co.

Marshall & French

Beresford & Co.

6,913 Arbutnot, Latham & Co.

Hoare, Wilson & Co.

761 A. Everingham & Co.

1,971 Benecke, Souchay & Co.

Saffron

Spain, 1 pks. T. Allen

R. Quincey & Son

Gambler

Singapore, 637 pks. L. & I. D. Jt. Co.

Brinkmann & Co.

E. Indies, 825 bls. L. & I. D. Jt. Co.

Elkan & Co.

Singapore, 29 pks. L. & I. D. Jt. Co.

Cutch

E. Indies, 400 pks. Wrightson & Son

Brinkmann & Co.

Rangoon, 2,212 Brown and Elmslie

Extracts

U. S., 10 pks. A. F. White & Co.

France, 4 R. J. Fullwood & Bland

Germany, 1 Domeier & Co.

U. S., 200 T. Ronaldson & Co.

Italy, 42 cs. L. & N. W. Ry. Co.

Madders

Holland, 12 pks. W. Balchin

Dyestuffs (otherwise undescribed)

E. Indies, 551 pks. L. & I. D. Jt. Co.

Props. Butler's Wf.

Holland, 76 Burt, Boulton & Co.

E. Indies, 300 L. & I. D. Jt. Co.

Guano—

France, 2,112 t. Anglo-Contl. G. Wks.

Glycerine—

France, £65 Major & Field

Holland, 480 Spies, Bros. & Co.

F. W. Heilgers & Co.

Germany, 130 Beresford & Co.

Glucose—

U. S., 25 pks. 200 cwt. Union

Lighterage Co., Ltd.

118 650 cwt. C. South-

well & Co.

Glucose—continued.

Germany, 25 pks. 200 cwt. L. Sutro

M. D. Co.

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100 100 J. Barber & Co.

Sodium Acetate—

France, £57 Barr, Meering & Co.

Sodium Sulphate—

Holland, £45 J. Owen

H. Lorenz

Salammoniac—

Holland, £133 Barr, Meering & Co.

Saltpetre—

Germany, 11 cks. J. A. Reid

P. Hecker & Co.

E. Indies, 35 P. Hecker & Co.

C. Wible & Co.

Clift, Nicholson & Co.

Stearine—

Belgium, 150 cks. H. Hill & Sons

Germany, 150 cks. T. H. Lee

France, 51 bgs. H. Hill & Sons

Tartaric Acid—

Holland, 22 pks. B. & F. Wf. Co.

France, 8

Holland, 20 Middleton & Co.

B. & F. Wf. Co.

C. Christopherson & Co.

Tartar—

Italy, £925 Thames S. Tug Co.

Ultramarine—

Germany, 2 cs. G. Steinhoff

Belgium, 9 cks. Leach & Co.

Holland, 4 W. Harrison & Co.

Oehlenschläger

Verdigris—

France, 2 cks. N. Steinberg

Zinc Sulphate—

Germany, £60 Howards & Son

Zinc Oxide—

Germany, 5 cks. Beresford & Co.

50 brls. M. Ashby, Ltd.

Holland, 75

LIVERPOOL.

Week ending May 15th.

Ammonia—

Bordeaux, 1 cs.

Acetate of Lime—

St. Nazaire, 84 cks.

Albumen—

Bruges, 20 cs. J. T. Fletcher & Co.

Barytes—

Antwerp, 45 bgs. 12 cks.

Cream of Tartar—

Bordeaux, 4 cks.

Caoutchouc—

Lagos, 1 cs. Pitt Bros.

Quittah, 1 ck. J. H. Rayner & Co.

2 brls. W. J. Rodatz & Co.

Accra, 3 Hutton & Co.

1 Davis, Robbins & Co.

2 Edwards Bros.

5 M. Herschell & Co.

8 Pickering & Berthoud

12 J. J. Fischer & Co.

Cape Coast, 1 pn. 1 bg. Edwards Bros.

3 brls. A. M. Waite & Co.

1 cs. Fletcher & Fraser

1 Symington & Co.

1 pn. S. & C. Nordlinger

1 ck. W. B. McIver

1 brl. C. L. Clare & Co.

1 S. Henrichsen

2 Mordaunt Bros.

5 20 pks. A. Miller

3 cs. 2 cks. 4 pns. F. & A. Swanzy

Axim, 3 brls. Pickering & Berthoud

1 bg. Edwards Bros.

1 brl. Edwards Bros.

Grand Bassam, 6 bgs. 1 cks.

Caoutchouc—continued.

Grand Bassam, 8 bgs. 5 cks.	W. D. Woodin
" 2 "	E. Wayland
" 3 "	F. & A. Swanzy
" 1 "	A. Miller, Son & Co.
" 1 "	Hobson & Co.
" 1 "	S. & C. Nordlinger
" 2 cs	Grimwade Ridley & Co.
Sierra Leone, 1 brl.	T. Christy & Co.
" 49 "	Pickering & Berthoud
" 2 pns. 19 brls.	Paterson Zachonis & Co.
" 20 "	Broadhurst, Sons & Co.
" 9 hds. 39 brls.	
Isles de Los, 415 "	F. Colin & Co.
" 25 pns. 2 "	Cie Francaise

Chemicals (otherwise undescribed)

Rotterdam, 4 cks.

Dyestuffs—

Fustic
Savanilla, 2,832 lbs. G. Muller & Co.
Carthagena, 451 ps. Mildred Goyeneche

Logwood

Boston, 200 bxs.
Belize, 60½ t.

Divi Divi

Carthagena, 8 bgs. Mildred Goyeneche
Havre, 202 bgs. Cunard S.S. Co., Limited

Extracts

Havre, 64 cks. Cunard S.S. Co., Limited
Bordeaux, 70 "

Argols

Oporto, 23 cks. F. Leyland & Co.
Brindisi, 568 bgs. Ger. Bank, London

Myrabolams

Bombay, 410 bgs. Forbes, Forbes & Co.

Glucose—

New York, 390 brls.
Dried Blood—

Iodine—

Valparaiso, 162 brls. A. Gibbs & Sons
" 22 W. & J. Lockett

Manure—

Bruges, 22 bgs.
Magnesium Sulphate—

Pitch—

Rotterdam, 65 cks.
Pyrites—

Huelva, 1,617 t.

" 971 Matheson & Co.
" 1,420 Tennants & Co.
Matheson & Co.

Potassium Muriate—

Hamburg, 2,954 bgs.
Phosphate—

St. Valery, 150 t.

Antwerp, 600 bgs.
Sodium Silicate—

Rotterdam, 1 ck.**Stearine—**

Antwerp, 51 bgs.
Saltpetre—

Antwerp, 135 bgs.

J. T. Fletcher & Co.
Sulphur Ore—

Huelva, 1,116 t.

Matheson & Co.
Tartar—

Havre, 7 "

Cunard S.S. Co., Ltd.
Tartaric Acid—

Rotterdam, 24 cks.

Rotterdam, 5
Turpentine—

Wilmington, 400 brls.

Ultramarine—

Rotterdam, 5 cs. 5 brls.

Rotterdam, 12 cks.
Verdigris—

Bordeaux, 2 cks.

Zinc Oxide—

Antwerp, 50 cks.**TYNE.**

Week ending May 15th.

Barytes—

Rotterdam, 22 cks. Tyne S. S. Co.
Copper Precipitate—

Huelva, 5,832 bgs.

Scott Bros.
Copper Ore—

Huelva, 168 t.

Rio Tinto Co.
Christiania, 1 bx.
Huelva, 1,056 Scott Bros.

Ferro Chrome—

Antwerp, 20 cs. Tyne S. S. Co.
Glucose—

Hamburg, 100 bgs.

Tyne S. S. Co.
Saltpetre—

Hamburg, 2 cks.

Tyne S. S. Co.
Saltcake—

Hamburg, 220 t.

Waste Salt—

Hamburg, 140 t.**HULL.**

Week ending May 15th.

Acids (otherwise undescribed)

Rotterdam, 12 cks. Hutchinson & Son
Barytes—

Rotterdam, 22 cks.

Antwerp, 12 Blundell, Spence & Co.
Bremen, 19
Chemicals (otherwise undescribed)

Genoa, 17 cks.

Wilson, Sons & Co.
Dunkirk, 139 pks. "

Antwerp, 77 "

G. Lawson & Sons
Stettin, 29 cks. Wilson, Sons & Co.
Bremen, 2 Veltmann & Co.

Dyestuffs—

Rennet
Rotterdam, 4 cks. W. & C. L. Ringrose
Copenhagen, 3 cks. Wilson, Sons & Co.

Extracts

Rouen, 54 cks. Rawson & Robinson
Alizarine

Rotterdam, 1 brl.

G. Lawson & Sons
" 38 pks. W. & C. L. Ringrose
" 53 cks. Hutchinson & Son
" 3 W. & C. L. Ringrose
" 14 "

Madders

Rotterdam, 2 cks.
Glucose—

Dunkirk, 60 bgs.

Wilson, Sons & Co.
Hamburg, 300 "

" 37 cks.

Woodhouse & Co.
" 10 Rawson & Robinson
New York, 120 brls.

Hamburg, 9 cks.

G. Lawson & Sons
" 100 bgs. Thompson, McKay and Co.
Stettin, 250 12 cks. Wilson, Sons and Co.

Glycerine—

Rouen, 1 ck. Rawson & Robinson
Manure—

Ghent, 190 t.

Wilson, Sons & Co.
Oxide—

Hamburg, 6 cs.

G. Malcolm & Son
Phosphate—

Ghent, 100 t. 1,173 bgs.

Wilson, Sons and Co.
Stearine—

Rotterdam, 50 cks.

G. Lawson & Sons
Tartar—

Bordeaux, 1 ck.

Tartaric Acid—

Rotterdam, 4 cks

" 4
Ultramarine—

Bremen, 1 ck.

Furley & Co.

GRIMSBY.

Week ending May 10th.

Glucose—

Hamburg, 55 cks.
Zinc Ashes—

Antwerp, 10 cks.**GLASGOW.**

Week ending May 15th.

Aluminium—

Antwerp, 3 cs.
Barytes Sulphate—

Antwerp, 200 bgs.

Barytes—

Rotterdam, 116 cks.

Dyestuffs—

Sumac

Palermo, 1,250 bgs. 50 bls.
Extracts

Bordeaux, 100 cks.

J. & P. Hutchinson
Rouen, 2
Antwerp, 9 1 cs.
Dunkirk, 5

Madder

Bordeaux, 13 cks.
Gutta Percha—

Rotterdam, 20 bkts.

J. Rankine
Glycerine—

Rouen, 10 cks.

J. Rankine
Glucose—

New York, 80 brls.

Nitrate—

Iquique, 9,110 bgs.

Thomson, Aik
Oxalic Acid—

Rotterdam, 5 cks.

Pyrites—

Huelva, 1,800 t.

Crossley, Tilburn
Sulphur—

Palermo, 260 bgs.

Saltpetre—

Rotterdam, 7 cks.

J. Rankine
Tartar—

Bordeaux, 6 cks.

J. & P. Hutcl
Tartaric Acid—

Rotterdam, 4 cks.

J. Rankine
Zinc Oxide—

Antwerp, 10 cks.

" 125
GOOLE.

Week ending May 7th.

Antimony—

Boulogne, 4 cks.
Caoutchouc—

Boulogne, 11 cks.

Dyestuffs—

Alizarine

Rotterdam, 22 cks. 71 pks.
Logwood

Kingston, 500 t.

Jamaica, 373
Dyestuffs (otherwise undescr

Boulogne, 95 cks.

61 cs.
Glucose—

Hamburg, 140 bgs.

18 cks.
Dunkirk, 120
Plumbago—

Boulogne, 180 cks.

Picric Acid—

Antwerp, 11 bgs.

Pyrites—

Huelva, 1,350 t.

Saltpetre—

Antwerp, 100 bgs.

Rotterdam, 240 bgs.
Soda—

Rotterdam, 6 cks.

Tartaric Acid—

Rotterdam, 2 cks.

Ultramarine—

Rotterdam, 5 cs.

Hamburg, 30
Waste Salt—

Hamburg, 708 bgs.

665 t.
" 711 457

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending May 10th.

Alum Cake—

Calcutta, 25 t. 18 c. £100

Ammonium Carbonate—

B. Ayres, 20 cs. 67
Rosario, 1 t. 32
St. Petersburg, 27 cks. £145
Yokohama, 1 t. 38

Ammonium Sulphate—

Cologne, 10 t. £112
Demerara, 100 1,200

Acetic Acid—

Brisbane, 12 cks. £34
Canterbury, 25 cs. 46

Acids (otherwise undescribed)

Cologne, 232 btls. £350
" 250 380

Citric Acid—

Melbourne, 20 kgs. £140
Libau, 40 40
Brisbane, 1 ck. 3 c. 14

Brussels, 15 112
Rowstow on Don, 6 50
Libau, 3½ 28
Cologne, 10 70
Dusseldorf, 2 14
Hamburg, 2 7
Genoa, 1 t. 150

Carbolic Acid—

Le Treport, 40 pks. 5 cs. £89
Tredort, 1 t. 8 c. 103
Barcelona, 13 30
Rotterdam, 5 12 160
Treport, 1,084 gls. £50
St. Petersburg, 18 cs. 161

Carbolic Solid—

Hamburg, 3½ c. £12

Copper Sulphate—

Antwerp, 4 cks. £30
Genoa, 60 t. 2 c. 7
Bordeaux, 6 2 135
Lisbon, 8 2 187

Genoa, 5 112
Barcelona, 10 2 210
Havre, 5 15 115
Marseilles, 5 123

Caustic Soda—

Auckland, 5 t. 1 c. £54
Seville, 28 336
Vancouver, 5 53
Natal, 10 9

Caustic Potash—

Geelong, 8 drms. £85

Cream of Tartar—

Brisbane, 2 c. 2 c.
Sydney, 2 t. 6
Townsville, 6 6
Brisbane, 6 10
Dunedin, 10 6
Melbourne, 6

Coal Products—

Pitch

New York, 96 cks.
Sydney, 24 brls.
Catania, 40
Antwerp, 760 t.

Rotterdam, 42
Abo, 150
Gothenburg, 80
Dinsburg, 125
Alexandria, 200
Helsingfors, 300
Christiania, 50 fms.
St. Nazaire, 1,048
Dunkirk, 292

Tar			Sodium Sulphate—			Borax—			Copper Sulphate—continued.		
Sydney, 24 pks.	£38		Norkoping, 200 t.	£250		Oporto, 12 c. 2 q.	£36		Leghorn, 23 27 3		
Natal, 850 dms.	34		Sheep Dip—			Antwerp, 3 1	5		Lisbon, 10		
Cape Town, 25	16		Algoa Bay, 7 t. 4 c.	£250		Melbourne, 6	9		Marseilles, 2 10		
Galatz, 200 rts.	126		Natal, 3 2	150		London (Ont.), 4 3	14		Bordeaux, 2 7		
Helsingfors, 308	229		Cape Town, 2	35		Boric Acid—			Halifax, 14 6		
Abo, 400	227		Karachi, 200 dms.	24		Havana, 3 c.	£10		Genoa, 10 14 1		
Taganrog, 200 brls.	120		Saltcake—			Zante, 2 1 q.	12		Passage, 55 7		
Danzig, 250	150		Antwerp, 115 t.	£220		Borate of Lime—			Tarragona, 1 12		
Abo, 500	160		Sulphur—			Rotterdam, 10 t. 5 c. 2 q.	£123		Venice, 1 8 3		
Gothenburg, 100	63		Lisbon, 8 t. 2 c.	£184		Carbolic Acid—			Bordeaux, 90 1 2		
Selyacte, 356	154		Natal, 3 t. 5 c.	25		Hamburg, 6 t. 2 c. 1 q.	£643		Montreal, 10 4 2		
Benzole			Algoa Bay, 20 c.	13		Calcutta, 1 2 2	25		Barcelona, 10 4 2		
Calais, 19 cks.	£450		Sulphur Flowers—			Madras, 1 12 3	22		Genoa, 59 7 1		
Terneuzen, 32 dms.	646		Cape Town, 35 cks. 40 kgs.	£58		Calcutta, 11 2	12		Leghorn, 27 15 7		
Rotterdam, 981	350		Salammoniac—			Genoa, 1 3	15		Odesa, 5 4 2		
Hamburg, 20 pns.	672		Cape Town, 1 t. 1 c.	£36		Charcoal—			Bilbao, 20		
Stettin, 1,250 rts.	1,380		Libau, 2 cks.	20		Hamburg, 50 t.	£247		Venice, 20		
Rotterdam, 30	40		Constantinople, 13	23		Callao, 151 7 c. 2 q.	£61		Bordeaux, 4 8		
Hamburg, 1 dm.	2		Galatz, 10	50		Copperas—			Genoa, 122 10 3		
Calais, 30	737		Hamburg, 1	23		Callao, 3 t. 10 c.	£8		Leghorn, 17 16 3		
Anthracene			Sodium Silicate—			Caustic Soda—			Chemicals (otherwise undescribed)		
Rotterdam, 150 cks.	950		Vancouver, 5 t. 17 c.	£22		Alicante, 10 dms.			New York, 11 c.		
Dusseldorf, 67	105		Auckland, 9 2	47		Amsterdam, 24			Santander, 17		
Naphthaline			Sodium Bicarbonate—			Antwerp, 222			Rotterdam, 9 t. 14 24		
Le Treport, 5 cks.	6		Auckland, 2 t.	£14		Barcelona, 120			San Juan, 3 c.		
Montreal, 2 2 c.	7		Superphosphate—			Bari, 60			Odesa, 4 27 7		
Stockholm, 2	17		Cherbourg, 165 t.	£480		Bilbao, 16			Epsom Salts—		
Hamburg, 7	55		Saltpetre—			Bombay, 18			Bombay, 27 cks.		
Stockholm, 58 2	151		Bordeaux, 1 t. 10 c.	£40		Bordeaux, 200			Calcutta, 9		
Hamburg, 10	57		Newcastle, 1	22		Calcutta, 100			Rio Janeiro, 50 kgs.		
Alizarine			Syria, 6 5	130		Carthage, 15			Alexandria, 200		
Boston, 20 12 kgs.	384		Oporto, 9 2	100		Ceara, 60			Rio Janeiro, 100 bgs.		
Naptha			Melbourne, 2 10	23		Demerara, 2			Montreal, 33 brls.		
Brussels, 2 cks.	£10		Oporto, 11 5	550		Fiume, 3			Iodine—		
Brisbane, 20 dms.	24		Rio Janeiro, 1 18	43		Galatz, 44			Hamburg, 9 t. 10 c.		
Toluole			Soda Crystals—			Genoa, 60			Iron Oxide—		
Rotterdam, 19 pns.	£237		Hong Kong, 15 t.	£44		Halifax, 5			B. Ayres, 15 t. 15 c.		
Creosote			Tartaric Acid—			Havana, 90			Gijon, 2 10 14		
Cologne, 224 cks. 656 bgs.	£307		Brisbane, 2 c.	£15		Hong Kong, 16			Magnesia—		
Cherbourg, 625 brls.	330		Dunedin, 4	28		Malaga, 76			Adelaide, 20 c.		
Bayonne, 1,046	575		Canterbury, 5	40		Montreal, 105			Rio Janeiro, 10		
Copperas			Auckland, 1 t.	133		Newfairwater, 108			Manure—		
Rotterdam, 100 kgs.	£20		LIVERPOOL.			New Orleans, 100			Barbadoes, 49 t. 10 c.		
Chemicals (otherwise undescribed)			Week ending May 14th.			New York, 200					
Cape Town, 330 cks.	£250		Ammonium Carbonate—			Passage, 100			Magnesium Carbonate—		
Calcutta, 20 c.	252		Bilbao, 6 c.	£10		Rotterdam, 2 brls.			Bilbao, 1 t. 2 c. 2 q.		
Adelaide, 7 pks.	110		San Francisco, 1 t. 6 1 q.	43		St. Petersburg, 50 dms.			Muriatic Acid—		
Toronto, 5	150		Leghorn, 15 1	27		Seville, 89			Demerara, 10 c.		
Madrid, 15	95		Montreal, 1	28		Sydney, 30			Oxalic Acid—		
Sydney, 179	179		Genoa, 11 3	16		Trieste, 5			Antwerp, 1 t. 20 c. 2 q.		
Disinfectants—				8		Venice, 15			Oxide of Lime—		
Brisbane, 5 c.	£41		Acetate of Lime—			Philadelphia, 50			Barcelona, 4 c.		
Hamburg, 13 pks.	24		Hamburg, 10 t.	£80		Genoa, 120			Pitch—		
Le Treport, 12	15		Ammonium Sulphate—			Hamburg, 225			Genoa, 320 t. 13 c.		
Calcutta, 2 t.	12		Barbadoes, 30 t. 9 c. 3 q.	£371		Leghorn, 32			Seville, 3 brls.		
Guano—			Valencia, 50 7 1	660		Madrid, 100			Phosphorus—		
Landerneau, 191 t.	£1,900		Alicante, 10 c.	£35		Matanzas, 32			Vera Cruz, 10 c.		
Berlice, 5 13 c.	60		Ammonium Muriate—			Monte Video, 100			Barbadoes, 1 c.		
Nevis, 25	250		Havre, 1 t. 2 c.	£20		Nantes, 67			Vera Cruz, 4 26		
Barbadoes, 5 3	24		New York, 3	199		Naples, 40			Potassium Carbonate—		
Hydro Carbon—			Alum—			New Orleans, 100			Montreal, 2 t. 15 c.		
Brussels, 2 t. 2 c.	£38		Galatz, 9 t. 1 c. 2 q.	£47		New York, 500			Picric Acid—		
Manure—			Madras, 8 2	39		Odessa, 25			New York, 1 t.		
Christiania, 5 t. 2 c.	£35		Melbourne, 1	35		Alicante, 20			Hamburg, 1 c.		
Berlice, 25	256		Madras, 4 9	29		Amsterdam, 40			Potassium Bichromate—		
Malaga, 31 12	320		Malta, 1 1	5		Bahia, 25			Marseilles, 10 c. 3 q.		
Havre, 35 3	211		Antimony Sulphide—			Barcelona, 80					
Dominica, 22 12	110		Barcelona, 2 c.	£13		Bari, 401			Potassium Prussiate—		
Cherbourg, 25	275		Acetic Acid—			Bordeaux, 10			Santos, 1 c.		
Nevis, 15	150		Rio Grande du Sol, 1 c. 3 q.	£5		Boston, 750			Potassium Chlorate—		
Demerara, 50	500		Bleaching Powder—			Bruges, 29			Naples, 10 c.		
Treport, 210	210		Bari, 40 kgs.	27		B. Ayres, 10			Philadelphia, 2 t. 10		
Lytletown, 100	1,350		Bordeaux, 31 cks.	84 tcs.		Calcutta, 170			Genoa, 10		
Malaga, 50	400		Montreal, 60			Carthage, 24			Gothenburg, 8		
Valencia, 170 11 c.	1,364		Passage, 7			Corfu, 40			Hamburg, 2 7		
Trinidad, 110 4	6,155		Bari, 145			Parahiba, 5			Potashes—		
Barbadoes, 200	1,040		Genoa, 15			Rio Janeiro, 15			Bordeaux, 16		
Nevis, 100	2,275		Antimony Sulphide—			Rotterdam, 32			Havre, 5 t. 27 c.		
Baltimore, 20	63		Barcelona, 2 c.	£13		Rouen, 58			Salt—		
Rouen, 34 12	180		Acetic Acid—			St. Petersburg, 1,028			Antwerp, 220 t.		
Bordeaux, 35 12	200		Rio Grande du Sol, 1 c. 3 q.	£5		Santos, 35			Bahia, 100		
Hobart, 52	702		Bleaching Powder—			Seville, 90 50 brls.			Brisbane, 100		
Launceston, 72	1,013		Bari, 40 kgs.	27		Sydney, 23			Cameroon, 66 14		
Muriatic Acid—			Bordeaux, 31 cks.	84 tcs.		Valencia, 45			Cape Coast, 125		
Natal, 1 t. 5 c.	£21		Montreal, 60			Venice, 89			Iceland, 89		
Nitric Acid—			Passage, 7			Calcium Chloride—			Manaos, 19 13		
Natal, 10 c.	£15		Bari, 145			Melbourne, 5 t.	£10		Montreal, 133		
Jersey, 4,080 lbs.	53		Genoa, 15			Copper Sulphate—			Newcastle, 24 4		
Oxalic Acid—			Barcelona, 20			Naples, 7 t. 6 c. 2 q.	£145		Para, 224 4		
Rotterdam, 15 c.	£20		Boston, 410			Passage, 10	190		Pasphebiac, 335		
Potassium Chlorate—			Calcutta, 410			Alicante, 20	12		Port Natal, 13		
Hong Kong, 2 t. 5 c.	£99		Genoa, 381			Ancona, 49 1	94		Quebec, 300 13		
Phosphoric Acid—			Leghorn, 10			Bari, 5 1 1	95		Rio Janeiro, 10		
Bisbane, 15 t.	£250		Montreal, 161			Bilbao, 30 1 3	640		Rotterdam, 648		
esium Citrate—			New York, 252			Bordeaux, 2 13	63		St. John, N.B., 500		
Hamburg, 7 c.	£45		Philadelphina, 117			Brindisi, 5 1 2	104		Trangemond, 1,505		
			San Sebastian, 29			Genoa, 20 9 1	745		Victoria, 12 1		
						Trieste, 7 8	165		Antwerp, 220		
						Venice, 52 16 1	1,004		Barbadoes, 17		
						Havre, 4 17 3	90				

Salt—continued.

Blackpoint,	15	
Boston,	150	
Brisbane,	1	
Bruges,	150	
B. Ayres,	4	
Cape Coast,	6½	
Copenhagen,	753	
Demerara,	17	17 c.
E. London,	17	18
Eloby,	7½	
Halmstat,	250	
Hamburg,	50	
Montreal,	295	
New York,	80	
Portland,	550	10
Port Natal,	32	
Sydney,	452	
Trinidad,	8	1

Sodium Bicarbonate—

Bremen,	4 kgs.	
Calcutta,	50	
Genoa,	50	
Hamburg,	70	15 brls.
Nantes,	26	10 cks.
Newcastle,	40	
Port Said,	9	
Rosario,	100	
St. John,	250	
Sydney,	350	
Valencia,	125	
Valparaiso,	11	
Boston,	100 cks.	
Copenhagen,	17	12 kgs.
Genoa,	27	
Konigsberg,	28	
Naples,	80	
Odessa,	185	
Stettin,	15	
Sydney,	54	20
Victoria,	20	

Soda Ash—

Baltimore,	84 tcs.	122 cks.
Barcelona,	6	35 brls.
Bombay,		25
Boston,	210	
Calcutta,		6
Cera,		50
Ghent,		42
New York,	288	382
Parahiba,		25
Philadelphia,	460	
Pireus,		50
Rio Janeiro,		245
San Francisco,	209	
Santos,	35	brls.
Sydney,	14	cks.
Baltimore,	166	tcs.
Bombay,	3	cks.
Boston,	1,040	bgs.
B. Ayres,	200	brls.
Callao,	30	
Havana,	2	cks.
Hong Kong,	4	brls.
New York,	463	tcs.
Philadelphia,	311	
Rio Janeiro,	75	brls.
Hamburg,	5	

Sodium Silicate—

Galatz,	10 brls.	
Seville,	17	

Soda Crystals—

Alexandria,	20 brls.	
B. Ayres,		34 kgs.
Calcutta,	100	
Gibraltar,	10	
Malta,	50	
Boston,	280	

Salammoniac—

Naples,	15 c.	£56
Ancona,	10	17
Genoa,	1 t.	7 2 q.
Alexandretta,	2	70
Smyrna,	1	35
Leghorn,	14	1
Malta,	4	7
Mersyne,	3	5
New York,	5	170
San Francisco,	10	3
Salsora,	3	19
Genoa,	14	1
59		

Saltpetre—

Montreal,	10 c.	£11
Pireus,	3 t.	15
Pernambuco,	2	10
Cera,	9	2 q.
Syria,	3	2
Vera Cruz,	1	15 2
44		

Sulphur—

Boston,	50 t.	£220
"	50	217
Lisbon,	19	13 c. 1 q.
Vera Cruz,	17	3
6		

Superphosphate—

Gr. Canary,	11 t.	3 c. 1 q.
Hamburg,	20	65
Las Palmas,	10	9
102		

Sodium Bichromate—

New York,	8 t.	10 c.
£230		

Sodium Biborate—

Antwerp,	6 t.	1 c. 3 q.
£183		
Genoa,	1	3 2
45		
Hamburg,	1	1 2
32		
Montreal,	4	16 1
145		

Saltcake—

Dunedin,	10 t.	11 c. 3 q.
£26		
New York,	50	1
125		

Sodium Nitrate—

Valencia,	5 t.	19 c. 2 q.
£50		
Trieste,	9	17 2
82		

Tar—

Grand Canary,	10 brls.	
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Zinc Chlorate—

Bombay,	17 c.	3 q.
£15		

GLASGOW.

Week ending May 15th.

Ammonia—

Trinidad,	4 t.	7 c.
£46		
Demerara,	283	1
3,049		

Bleaching Powder—

£35		
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Copperas—

Karachi,	£348	
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Copper Sulphate—

Rouen,	2 t.	16½ c.
£56		
Italy,	110 c.]	125

Dyestuffs—

Quebec,	£107	
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Extracts

£41		
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Epsom Salts—

Sydney,	£54	
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Gutta-Percha—

Sydney,	£54	
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Iodine—

Philadelphia,	60 c.	£3,840
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Manure—

Trinidad,	47 t.	£374
£243		158.
Demerara,	25	250
"	30	142
"	12	2 c.
Trinidad,	150	630

Paraffin Wax—

Hong Kong,	2 t.	1½ c
£57		
Japan,	4,191	lbs.
66		
Italy,	32	18 c.
932		

Potassium Prussiate—

Quebec,	20 c.	£88
£45		
Italy,	16½	267
New York,	68½	44
Gothenburg,	19 t.	10 c.

Potassium Bichromate—

Boston,	332 c.	£620
£155		
Quebec,	4 t.	8 c.
309		
New York,	165 c.]	1,115
145		
Rouen,	31 t.	13½
Gothenburg,	5	7
Antwerp,	309½ c.	£435
14		
Bergen,	1 ck.	14

Phosphate—

Demerara,	66 t.	£230
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Pitch—

Quebec,	23 t.	10 c.
£53		
Gothenburg,	244	13
330		
Granville,	100	160

Superphosphate—

Demerara,	10 t.	6 c.
£40		
Christiania,	20	100

Sulphuric Acid—

Karachi,	£56	
562		
Bombay,		
Rouen,	11 t.	11½ c.
£247		
Gothenburg,	62 cks.	530
238		
Italy,		110
"	79½ c.	

Tar—

Calcutta,	£63	
58		
Karachi,		

HULL.

Week ending May 13th.

Alkali—

New York,	239	cks.
8		
Trieste,		

Borax—

Helsingfors,	1 ck.	
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Bleaching Powder—

Trieste,	36 cks.	
Venice,	25	

Caustic Soda—

Abo,	30 drums.	
Helsingfors,	40	
111		
Konigsberg,	111	
Libau,	36	
Reval,	20 cks.	
Wyburg,	87 drums.	

Chemicals (otherwise undescribed)

Antwerp,	48 cks.	5 pks.
Abo,	1	
Bremen,	50	2 cs.
Barl,	10	50 kgs.
Christiania,	100	10 161 slbs.
Gothenburg,	14	
Helsingfors,	5	2 313
Hamburg,	5	236
Helsingfors,	3	
Libau,		10 pks.
Messina,	5	
New York,	50	
Odessa,	207	52
Palermo,	1 ck.	
Rouen,	36	
Rotterdam,	32	32 cs.
Stettin,	1	
St. Petersburg,	2	2 20 pks.

Dyestuffs (otherwise undescribed)

Antwerp,	1 drum.	
Hamburg,	9	2 cks.
Rotterdam,	3	3 cs. 5 kgs.

Manure—

Antwerp,	576	bgs.
Hamburg,		21 bls.

Pitch—

Antwerp,	485 t.	
Venice,	200	

Salt—

Hango,	1 cs.	
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Tar—

Amsterdam,	6 cks.	
Abo,	150	
Bergen,	16	
Copenhagen,	16	
Hamburg,	2	
Rotterdam,	11	

Turpentine—

Stettin,	15 cks.	
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TYNE.

Week ending May 15th.

Antimony—

Hamburg,	1 t.	10 c.
New York,	30	

Alum—

Rotterdam,	10 t.	2 c.
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Anthracene—

Rotterdam,	25 brls.	
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Alkali—

Gothenburg,	21 t.	7 c.
Antwerp,	4	16
Genoa,	5	10
Stettin,	5	11
Amsterdam,	15	18
Rotterdam,	11	

Ammonium Sulphate—

Valencia,	121 t.	3 c.
Stettin,	10	

Bleaching Powder—

Pasages,	91 t.	3 c.
Gothenburg,	7	
St. Petersburg,	122 t.	13
Hamburg,	43 t.	1
Antwerp,	50	4
Christiania,	20	1
Dunkirk,	25	1
Stettin,	78	7
Riga,	58	2
Amsterdam,	15	8
New York,	50	8
Rotterdam,	31	19
San Francisco,	65 t.	5

Barytes Carbonate—

Hamburg,	10 t.	
Riga,	157	11 c.

Calined Magnesia—

Genoa,	7 c.	
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Caustic Soda—

Genoa,	3 c.	
Stettin,	10 t.	3
Riga,	16	5
New York,	229	2
Valencia,	14	10
Gothenburg,	2	10

Copperas—

Pasages,	14 c.	
Copenhagen,	2 t.	8

Gypsum—

New York,	72 t.	10 c.
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Litharge—

Gothenburg,	1 t.	6 c.
"	1	2
Hamburg,	2	8
Amsterdam,		5 c.
Oporto,	3 t.	19
New York,	2	10
Rotterdam,		11
Stettin,	3	6
Riga,	4	4
Copenhagen,		11

Magnesia—

Valencia,		5 c.
Hamburg,	1 t.	5
New York,	1	2

Oxalic Acid—

New York,	11 t.	4 c.
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Potassium Chlorate—

Antwerp,	2 t.	2 c.
Stettin,	4	10
Rotterdam,	1	

Pitch—

Elsinore,	46 t.	10 c.
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Salt—

Esbjerg,	2 t.	
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Sodium Sulphate—

St. Petersburg,	12 t.	3 c.
Copenhagen,	15 t.	14

Soda Ash—

Hamburg,	13	10
Stettin,	11	11
New York,	50	8
San Francisco,	100 t.	7

PRICES CURRENT.

WEDNESDAY, MAY 22, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt.	7/-	&	12/6
" Glacial	"	65/-		
Arsenic, S.G., 2000°	"	0	12	9
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	"	0	0	3½
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
(Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1½
Oxalic	nett	3¼	d	to 4d.
Picric	"	0	1	2
Sulphuric (fuming 50 %)	per ton	15	10	0
(monohydrate)	"	5	10	0
(Pyrites, 168°)	"	3	2	6
(" 150°)	"	1	5	0
(free from arsenic, 140/145°)	"	1	7	6
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	"	0	1	3
Arsenic, white powdered	per ton	13	0	0
Alum (loose lump)	"	4	17	6
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 880=28°	per lb.	0	0	3
=24°	"	0	0	1½
Carbonate	nett	0	0	3½
Muriate	per ton	23	0	0
(sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
Nitrate	per ton	40	0	0
Phosphate	per lb.	0	0	10½
Sulphate (grey), London	per ton	11	6	3
" (grey), Hull	"	11	5	0
Aniline Oil (pure)	per lb.	0	10	½
Aniline Salt	"	0	9	¼
Antimony	per ton	75	0	0
(tartar emetic)	per lb.	0	1	1
(golden sulphide)	"	0	0	10
Barium Chloride	per ton	8	5	0
Carbonate (native)	"	3	15	0
Sulphate (native levigated)	"	45/-	to	75/-
Bleaching Powder, 35 %	"	5	0	0
Liquor, 7 %	"	2	10	0
Bisulphide of Carbon	"	13	0	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	2	6
China Clay (at Runcorn) in bulk	"	17/6	to	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	5
Benzol, 90 % nominal	per gallon	0	3	9
50/90	"	0	2	9
Carbolic Acid (crystallised 35")	per lb.	0	0	8
" (crude 60°)	per gallon	0	2	2
Creosote (ordinary)	"	0	0	2½
(filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30 % @ 120° C.	"	0	1	4
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	8	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	9
Coke-oven Oils (crude)	"	0	0	2½
Copper (Chili Bars)	per ton	52	17	6
Sulphate	"	26	0	0
Oxide (copper scales)	"	55	0	0
Glycerine (crude)	"	30	0	0
(distilled S.G. 1250°)	"	60	0	0
Iodine	nett, per oz.	0	0	9
Iron Sulphate (copperas)	per ton	1	10	0
Sulphide (antimony slag)	"	2	0	0
(sheet) for cash	"	14	10	0
Litharge Flake (ex ship)	"	15	10	0
Acetate (white ")	"	24	0	0
" (brown ")	"	18	0	0
" (white lead) pure	"	19	0	0
" "	"	22	5	0

Lime, Acetate (brown)		£	s.	d.
" (grey)	per ton	7	15	0
Magnesium (ribbon and wire)	per oz.	0	2	3
Chloride (ex ship)	per ton	2	5	0
Carbonate	per cwt.	1	17	6
Hydrate	"	0	10	0
Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	17	10	0
Borate (1st and 2nd)	per cwt.	60/-	&	42/6
Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	10
Miscible, 60° O.P.	"	0	4	6
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	26	0	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5½
" American	"	0	0	5½
Potassium (metal)	per oz.	0	3	10
Bichromate	per lb.	0	0	4
Carbonate, 90% (ex ship)	per ton	19	0	0
Chlorate	per lb.	0	0	4½
Cyanide, 98%	"	0	2	0
Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
" (Caustic Potash) 75/80 %	"	21	10	0
" (Caustic Potash) 70/75 %	"	20	15	0
Nitrate (refined)	per cwt.	1	2	6
Permanganate	"	4	2	6
Prussiate Yellow	per lb.	0	0	9½
Sulphate, 90 %	per ton	9	10	0
Muriate, 80 %	"	7	15	0
Silver (metal)	per oz.	0	3	11½
Nitrate	"	0	2	8
Sodium (metal)	per lb.	0	4	0
Carb. (refined Soda-ash) 48 %	per ton	6	5	0
" (Caustic Soda-ash) 43 %	"	5	5	0
" (Carb. Soda-ash) 48 %	"	5	12	6
" (Carb. Soda-ash) 58 %	"	6	15	0
" (Soda Crystals)	"	2	17	6
Acetate (ex-ship)	"	16	0	0
Arsenate, 45 %	"	11	0	0
Chlorate	per lb.	0	0	6½
Borate (Borax)	nett, per ton	29	0	0
Bichromate	per lb.	0	0	3
Hydrate (77 % Caustic Soda)	per ton	9	15	0
" (74 % Caustic Soda)	"	8	15	0
" (70 % Caustic Soda)	"	7	17	6
" (60 % Caustic Soda, white)	"	6	17	6
" (60 % Caustic Soda, cream)	"	6	15	0
Bicarbonate	"	6	0	0
Hyposulphite	"	5	10	0
Manganate, 25%	"	9	0	0
Nitrate (95 % ex-ship Liverpool)	per cwt.	0	8	1½
Nitrite, 98 %	per ton	28	0	0
Phosphate	"	15	15	0
Prussiate	per lb.	0	0	7½
Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
Stannate, 40 %	per cwt.	2	0	0
Sulphate (Salt-cake)	per ton	1	5	0
" (Glauber's Salts)	"	1	10	0
Sulphide	"	7	15	0
Sulphite	"	5	5	0
Strontium Hydrate, 98 %	"	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	7½
Barium, 95 %	"	0	0	7½
Potassium	"	0	0	8
Sulphur (Flowers)	per ton	7	10	0
" (Roll Brimstone)	"	6	0	0
Brimstone: Best Quality	"	4	7	6
Superphosphate of Lime (26 %)	"	2	13	6
Tallow	"	25	10	0
Tin (English Ingots)	"	98	0	0
Crystals	per lb.	0	0	6½
Zinc (Spelter)	per ton	23	0	0
Chloride (solution, 96° Tw.	"	6	0	0

THE CHEMICAL TRADE JOURNAL.

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No. 158.

SATURDAY, MAY 31, 1890.

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

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Legal.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION

TUESDAY, APRIL 29.

(Before Mr. Justice DAY and a Special Jury.)

STOCKMAN v. DASNIERES—A TRANSACTION IN PIT

(Continued from page 331.)

SHORTHAND WRITER'S NOTES OF JUDGE'S SUMMING UP.

IT is a thing, no doubt, that a lot of people have been getting a deal used to this system of perquisites, and of persons, if I may so, warping their own judgments and diminishing their own efficiency by taking perquisites. It is done in households, no doubt, to a large extent, and I very little doubt that masters who employ servants are not benefited by the fact that your servants get perquisites—allowances from various tradesmen with whom you deal. But it is because it is generally done by, we will say, domestic servants, that is lawful or proper, or if I use another expression, looking at it strictly honest, because you have no business to receive money by way of perquisites which must be charged against your master in one way or the other.

That is the thing that is complained of on the part of the defendant when he says, my servant has been taking trimming without my knowledge, not telling me about it or asking me whether I approve of it, he has been doing this, and doing it systematically, and he has been charging prices such as we have had proved in evidence before. Certainly the prices we have now were higher than the 2d. paid Jones, and, no doubt, more than Becton, who used, as I gather, as said before, to get 3d., and at the most 3½d., while in one instance we know the plaintiff has obtained as much as 4d.

It might be inconvenient with reference to Becton people or people like Mr. Leonard, who complained of this. Mr. Leonard might object and might dislike it, and as Mr. Dasnieres says—"It is not convenient for me to make things unpleasant to the persons with whom I deal. It is inconvenient in my business to do things, or for my servant rather to do things, that are inconvenient to the seller of the goods."

He naturally wishes to be on good terms with the person with whom he deals, and Mr. Leonard does object to this system, and made objection at this time on the occasion of the dinner in August, 1887. Then, it is said that there is no harm done to Mr. Dasnieres, because Mr. Dasnieres would not have done it himself, but why would not Mr. Dasnieres have done it? He says—"It is not my business, and I would not do it, I wish to please my customers." The servant is justified by saying—"My master would not do it, and therefore I do it myself." If he had consulted his master, very likely Mr. Dasnieres would have done it himself, Mr. Dasnieres says it is inconvenient for him to do so. I will not say he put on unfriendly terms, but to do a thing which is obnoxious to Mr. Leonard. This thing has been going on for years in secrecy. It has been communicated to him, but done without his consent. He says he could not possibly have thought of such a thing going on. It is for you to say whether such a course of conduct does justify the dismissal, not of an ordinary servant, but of a manager, *alter ego*, the person who is managing the things for you, and whom you have to trust to a considerable extent.

Then, gentlemen, the substantive ground of justification is the fact that with reference to the transaction in pitch. You have to consider the transaction in November. There is evidence before you of a somewhat serious character upon that transaction. It was clearly the duty of Stockman, whatever he thought about his master, I should say, to communicate to him offers; and if 4,000 tons were offered, it was not should have thought, for him to determine whether his master should buy upon a rising market or not, it was for him to communicate to

400 tons were offered. Mr. Stockman seems to have said that his impression was that he had communicated to his employer. When he is asked—"You could only have done it by letter or by telegram," he says—

The one was in Paris and the other was in London. Though the telegrams you do not find any communication by telegram to the effect that there were 4,000 tons offered. It is for you to consider, it seems to me at least, whether the servant was over-bought or was not over-bought. We are to be found in any of the letters or correspondence received; and it is not to be found in the copy letter of the telegrams, and I think you will probably come to the conclusion that Stockman did fail to communicate that offer to his master. What is done? who does buy it? Stockman buys it, and you will probably be of opinion that not having communicated to his employer that there was this 1,000 tons in the market, he buys it. Why does Stockman buy it? It cannot be said that he was under-bought or over-bought, because he had no other market except the open market. He bought for a rise—surely it was his duty, as a servant, to have the benefit of an opportunity of making 1,000 tons. He does not communicate with his master, in the probable rise, he goes and buys a 1,000 tons. It is not to be the gravaman of the whole charge. It is not to be said, as it has been put to be. It is a failure on the part of the servant to communicate to his master an offer of goods which by its appearance of involving satisfactory results, because it is his duty. He would not have bought it if he had not had this sort of stuff was going to rise. He does not have the opportunity of buying it, but being here to look after his master's interest, he buys it himself. What next took place? He wanted, and on the 13th November, eight days after the 5th by Stockman. What does he do? He does tell his master. "I can let you have some at a slight profit. I have got a lot—1,000 tons—which I can sell to you." He does not go to his master at all, but actually realises his profit and exposes his master to have to pay Blagden come to the purchase by Dasnieres; because, when he realises his profit, by closing his account with him, and receiving the goods, he sells to Blagden as though Blagden were principal, understanding that it is to be handed over to Dasnieres at price which he receives the benefit of. I can only say there is no question in point of law that that profit, at any rate for which the servant is accountable to the master. Of course there is no question. But there is still the question, whether it is a dismissal. That is a matter which is for you. It is done in secrecy. No trace of it is communicated to Mr. Dasnieres. The goods are bought without any communication to Mr. Dasnieres that they were in the market. They were offered to the servant by Mr. Dasnieres under circumstances of the market which would lead the servant to think it was a desirable thing for him to do, and, without any communication to Mr. Dasnieres, he communicated to his master for himself, upon which he makes a profit. The goods he afterwards sells to his master, without any communication of any sort or kind. That is a matter which certainly is of very serious consideration. It is for you to say what you would take, or what you think a prudent manager would take, that the manager, when he lives in another country, and has to manage his affairs, does act in that manner. Consider that, and consider the question of the trimming. It is necessary to trouble you with any observations upon other matters, to which attention has been called. The matters seem to be the more serious features in the case. It is not necessarily of fraud and dishonesty; but it is a matter which this man has so conducted himself in his employment, that it is reasonable for a master to say: "You shall be manager; I dismiss you at once," if, in your judgment, it is reasonable for a master in acting in that way, if that is the case, I think a reasonable employer would take, to dismiss the servant, the justification is made out, and you will find your verdict for the defendant, upon the question of justification. It is not to be of another opinion, and think that these measures taken by Mr. Dasnieres in dismissing the plaintiff, then you have to say that damages Mr. Stockman is entitled to for being dismissed from the service of Mr. Dasnieres, practically, three months, when he could be dismissed. As I have said, being given three months notice, he would be now, practically, at the end of three months notice, and he would be entitled to compensation for that remaining period. His salary, as you know, was £100 a year, and he was also entitled to commissions, the amount of which was £250 up to the time of his leaving the service. You will find about the others, because those will, in any event,

be provided for. You have to consider what you will allow in respect of loss of salary, and also commissions for the three months, what would be a reasonable compensation for not having three months notice, three months during which he might have earned the fourth part of £300 a year, £75, and might have earned commissions. It is for you to say what would be a reasonable compensation for being deprived, for that time, altogether of the situation, in which he might have made the emoluments to which I have referred. That will be in the event of your finding that justification is not made out. If justification is made out, you will simply find your verdict for the defendant. The earned commission, as I say, to be paid by the defendant to the plaintiff, will be ascertained out of court, and you need not trouble yourselves with reference to it.

There is one other question which has been raised, and that involves simply a question of law, viz., the question of the right of the defendant to an account with reference to profits made in respect of the trimming, and also profit made in respect of the transaction in pitch. There are questions which seem to me to be questions of law, and no question of fact really arises, the substantial question for you is, whether the justification has been made out or not. Consider your verdict, gentlemen, and say how you find.

The Jury consulted together for a short time.

The ASSOCIATE: Gentlemen, are you all agreed?

The FOREMAN: Yes, we are all agreed.

The ASSOCIATE: Do you find for the plaintiff, or for the defendant?

The FOREMAN: The defendant.

Mr. JELF: I should ask your Lordship, then, for judgment for the defendant, upon the cause, so far as it is an action for wrongful dismissal, and with regard to the other part of the case—

Mr. JUSTICE DAY: The defendant is entitled to an account.

Mr. JELF: I agree, I was only going to say that the costs of fighting this action should be ours.

Mr. JUSTICE DAY: Of course, the costs of trial will be the costs of the defendant, but there will be some costs for the plaintiff. I mean the Writ, and there may be the Statement of Claim. There must be some costs.

Mr. DICKENS: The usual costs of the issue upon which the plaintiff has succeeded and the usual costs of the issue upon which the defendant has succeeded.

Mr. JUSTICE DAY: It is merely a question of taxation. I direct an account. The master will arrange it.

Mr. JELF: That will depend upon what happens with regard to the contra account.

Mr. JUSTICE DAY: Then I had better not determine it now.

Mr. JELF: If your Lordship will give us liberty to apply.

Mr. JUSTICE DAY: Certainly.

Mr. DICKENS: With reference to the £56, they are entitled to that. There is no question about that. With reference to the trimmings I deny that they are entitled to that.

Mr. JELF: We do not ask for the whole trimmings. It is so much of the trimmings.

Mr. JUSTICE DAY: That is a matter which you had better reserve.

Mr. JELF: I was thinking that my friend and I might consider these things and set off one against the other.

Mr. JUSTICE DAY: You can have it brought before me in Middlesex Juries Chambers, or Bankruptcy, or elsewhere. You can have it put before me.

Mr. JELF: We had better take the verdict of the Jury and your Lordship orders the costs of the trial to be ours.

Mr. JUSTICE DAY: If you fix any day convenient, I daresay I shall be sitting here for weeks. I do not know what I may be ordered to do to-morrow, but so far as I know I shall be here and any day which is convenient to you to come before me, you can without having a special appointment. You can come before me to-morrow morning, or any time when it is convenient to yourselves, if you two can agree any time convenient to yourselves.

Mr. JELF: May we mention a day?

Mr. JUSTICE DAY: No, instead of mentioning a day, come and argue the matter. Come in when it is convenient to argue the question at any time and I will take it.

Mr. JELF: If your Lordship pleases.

SUNLIGHT FOR MATURING WINES.—Experiments have recently been made in Spain, on the action of sunlight in maturing wines. Layers of new wines in bottles of coloured glass have been exposed to the direct rays of the sun, with the result, that both the flavour and quality have been improved. In the South of Europe, there has been a practice of ripening cognac, by exposing the bottle on the roof for years.

GRANTS TO AGRICULTURAL AND DAIRY SCHOOLS.

A PARLIAMENTARY Paper issued by the Board of Agriculture contains a report on and a list of the distribution of the Parliamentary grants in aid of agricultural and dairy schools, and for agricultural experiments, in the year ended March 31, 1890. The Board of Agriculture, on its formation on the 9th of September, 1889, was intrusted with the duty, formerly devolving on the Lords of the Committee of Council on Agriculture, of awarding grants for the promotion of technical instruction in agriculture. The present system is only an experiment following the policy of the Privy Council in the previous year. The following table shows that 25 separate institutions received assistance from the grants, and also the amount and the purpose in each case :—

Institution or School.	Dairy Instruction.	General Agricultural Instruction.	Experiments.	Forestry.	Total.
England and Wales.	£	£	£	£	£
Bath and West of England Society and Southern Counties Association (Dairy Schools and Experiments)	300	—	150	—	450
Aspatia Agricultural College (General Agricultural Instruction and Dairying)	150	250	—	—	400
University College of North Wales, Bangor (General Agricultural Instruction and Dairying) ..	105	275	20	—	400
Leicestershire Education Committee (Daily Lectures) ..	250	—	—	—	250
Eastern Counties Dairy Institute (Dairy Classes and Local Lectures)	250	—	—	—	250
Cheshire County Dairy Institute	200	—	—	—	200
British Dairy Farmers' Institute, Aylesbury	200	—	—	—	200
Norfolk Chamber of Agriculture (Experiments)	—	—	150	—	150
Sussex Association for the Improvement of Agriculture (Experiments)	—	—	150	—	150
Gloucester Dairy School	75	—	—	—	75
Royal Manchester, Liverpool, and North Lancashire Society (Experiments)	—	—	35	—	35
Hereford and Ross Dairy Lectures	25	—	—	—	25
Swanley Horticultural and Technical College (Fruit-growing and other Lectures)	—	25	—	—	25
Scotland.					
University of Edinburgh (Teachers' Class and Forestry Lectures) ..	—	400	—	100	500
Glasgow and West of Scotland Technical College (General Agricultural Instruction) ..	—	350	—	—	350
Scottish Dairy Institute, Kilmarnock (Cheese-making and General Dairy Work)	250	—	—	—	250
University of Aberdeen, Fordyce Trust (General Agricultural Instruction)	—	200	—	—	200
Heriot Watt College, Edinburgh (General Agricultural Instruction)	—	150	—	—	150
Aberdeenshire Agricultural Research Association (Experiments)	—	—	150	—	150
Institute of Scottish Teachers of Agriculture (Providing Schoolmasters with Agricultural Information)	—	100	—	—	100
Wigtownshire Dairy Association	100	—	—	—	100
Stewartry of Kirkcudbright Dairy Association	70	—	—	—	70
Angus and Mearns Dairy School	50	—	—	—	50
Dumfriesshire Dairy Association	30	—	—	—	30
Dounby Science School, Orkney (Experiments)	—	—	25	—	25
Total Great Britain ..	2055	1750	680	100	4585

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favor by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds
ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Plant generally.

BLACKMAN VENTILATING CO., LONDON.—Fans, Air Prope Ventilating Machinery.

G. G. BLACKWELL, LIVERPOOL.—Manganese Ores, Bau French Chalk. Importers of minerals of every description.

BRACHER AND CO., WINCANTON.—Automatic Stills, and P Mixing Machinery for Dry Paints, Powders, &c.

BRUNNER, MOND AND CO., NORTHWICH.—Bicarbonate of Soda Ash, Soda Crystals, Murate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.

BUCKLEY BRICK AND TILE CO., BUCKLEY.—Fireclay ware (kinds)—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.

CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Drier Steam Traps (McDougall's Patent).

W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.

CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Benzole, Toluole, Xylole, and Nitro-compounds of all kinds.

J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.

R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Blowing Engines, Filter Presses, Sludge Pumps, &c.

DAVIS BROS., MANCHESTER.—Samples of Products from various chemical products—Coal Distilling, Evaporation of Paper-Treatment of waste liquors from mills, &c.

R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Plant Holders, Condensers, Purifiers, &c.

DOULTON AND CO., LAMBETH.—Specimens of Chemical Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.

E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Or Bleached Esparto-Pulp, Ozonised Oil, Ozone-Ammonia Lime, &c.

GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.

GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. S Materials, India-rubber Chemicals.

JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Water.

JOSEPH KERSHAW AND CO., HOLLINWOOD.—Soaps, Greases, Varnishes of various kinds to suit all requirements.

C. R. LINDSEY AND CO., CLAYTON.—Lead Salts, (Acetate, Nitrate, etc.) Sulphate of Copper, etc.

CHAS. LOW AND CO., REDDISH.—Mural Tablet-makers of Car Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants, &c.

MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours, Samples of Dyed Goods and Miscellaneous Chemicals, organic and inorganic.

MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhaust Silents Boiling Jets, Air Compressors, and Acid Lifters.

E. D. MILNES AND BROTHER, BURY.—Dyewoods and Dye Extracts. Also samples of dyed fabrics.

MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Made of all kinds of heating appliances.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, Recycled Sulphur, etc.

ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings, illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent Valves.

J. ROYLE, MANCHESTER.—Steam Reducing Valves.

A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitutes, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, Disinfecting Fluids.

WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pump Machinery. Speciality, their "Duplex" Pump.

JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-Heater. Makers also of Multiple Effect Stills, and W Softening Apparatus.

ELECTRICITY AS A HASTENER IN THE TANNING OF HIDES.

IT is somewhat remarkable that so little application has been made of electricity to industrial processes in which chemical operations are involved. If the metallurgical operations of electro-depositing and electric smelting be excepted, the Cassel gold chlorination, Hermite's bleaching, Webster's sewage, and Figgé's unsavoury process for "de-gumming" rhea fibre, have alone been tried on any large scale. Regarding an electric current as a mode of conveying energy, it has to compete with heat and the various forms of chemical energy, the applications of which entail, generally, a comparatively small outlay for plant; but where a distinct local effect, or where the action of so-called nascent elements is required, it would seem that electricity might frequently be employed with economy.

Many of the most important chemical processes of the day, have been worked out in the laboratory by the patient application of chemical principles at the hands of skilled chemists, and in this respect, the electric method of tanning is singular, since we have not been able to hear of even the existence of a chemical hypothesis to account for its results. The British Tanning Company have recently started, at Rotheras Street, Bermondsey, London, S.E., a practical method of tanning "by electricity." The company was formed about a year ago, to work in this country, the patents of Worms and Ball, who, after many experiments, managed, in Paris, to successfully overcome the difficulties which Goulard and the earlier investigators in this direction had met with. It will be within the recollection of many of our readers that, at the Paris Exhibition, several specimens of leather, tanned in France by this process, were shown in the saddlery department. The English company at first started with a small plant of French manufacture, but they have recently erected a new series of drums, which have been at work for some weeks past, yielding very satisfactory results. In the present process, the hides, after the usual liming and depilating process, are transferred to large wooden drums, nearly 12ft. in diameter, and as many feet in length. These are mounted on a horizontal axis so arranged as to permit of being slowly rotated by steam power. Each drum is then charged with about 500 gallons of ordinary tanning liquor, of about 20° strength, made from either oak bark or chestnut, and, after the addition of a small quantity of turpentine, is hermetically sealed. Thus far, the method differs but little from the various processes which have been tried, with small success, to substitute for the hand labour involved in daily turning the hides, a mechanical movement to the tanning extract, and suspended hides. In the electrical process, which we had an opportunity of seeing at work last week, a few feet of copper wire, forming the electrodes for a current which enters at one end and leaves at the other, are fastened within the flat sides of the rotating drums. The copper electrodes are provided on the shafts outside, with rubber contacts, consisting of ordinary dynamo brushes, to which the leads from a small dynamo are attached. At the Bermondsey works, there are five such drums, and a current of twelve amperes, at a pressure of 70 volts, is used, or about 14 volts for each drum. The joint effect of this mechanical agitation of the pelts and liquor, and the passage of this low density current, is stated to reduce the time required to successfully tan half a ton of hides per drum from several months, to four or five days. After working for some little time a slight heating of the liquor is noticed, and the electrolytic gases produced exert a small pressure within the drum, which is controlled by a spring valve, but no data seem to be forthcoming as to what influence this increase of temperature and pressure have upon the result. The former effect might, of course, be obtained more economically, while the latter is in this case small, and has been applied much more elaborately in the hydraulic process of Spilsbury in 1823, and the vacuum process of Knowles and Duesbury, both of which failed many years ago.

We are informed that the simple mechanical agitation has been found to reduce the time necessary for tanning to one-half, the rest of the great economy being attained by the inexplicable electric action. It is obvious that it is extremely difficult even to devise experiments which would be successful in differentiating the part played by the various forms of energy which apparently influence the result, but until this is done a full explanation of the increased rapidity of the tanning is impossible.

A considerable stock of finished butts and skins were on view at the time of our visit; and, in the opinion of experts, the tanning process was stated to be fairly complete and well struck through, but the butts were generally more supple than is considered advisable for boot soles. The continual mechanical agitation in bulk would naturally open the pores of the hide; and it is suggested, somewhat vaguely, that the electric current has a similar effect, presumably in a manner akin to the action of a current on osmosis and dialysis, though in this case there is no definite direction, as the hides are being continually churned in the liquor. Turnbull, in 1845, patented a process in which

endosmosis of the liquor through the pelts was hastened by firming them into bags, into which the ground tanning material was placed, together with water, and then immersed in a strong extract of catechu, but the method has not found favour with manufacturers generally. It is difficult to see what useful electrolytic action can take place, for it is not claimed, as in the bleaching process, that any chemical changes are produced, nor would such action favour any ferment of the liquor or dehydrating action.

The chemistry of the tanning process is still very obscure, and, as we have already pointed out, there is a great deal of systematic scientific research required before a satisfactory explanation of the new method can be given. Although the electric current does undoubtedly do a small amount of electrolytic work within the drum, it is probably confined to the water and inorganic salts present, as it has yet to be shown that complex molecules of the gallic and tannic acid type can be decomposed in this way. It must not, however, be forgotten that all tannins are characterised by a great avidity for oxygen, and it may be that a temporary oxidation of the active tanning principle renders it in a position to enter more readily into condensation with the gelatine of the pelt. It has been suggested that the action may be analogous of that of a mordant in dyeing, the ions liberated by the electric current determining the motion of the tannin molecules in the solution towards the gelatine. It is difficult to imagine that the electric current has any direct effect on the condensation of the gelatine and tannic acid in the production of leather, as there is no extraneous evidence to warrant the assumption that the electric current is capable of acting as a dehydrating agent. In the production of leather from the simpler molecules one would imagine that heat would be evolved, and that, therefore, it would be unnecessary to furnish additional energy to bring about the change.

The system at work at the British Tanning Company's place does not stand alone, but the results, unintelligible though they be, are confirmed in a highly satisfactory manner by a different application of electricity under the Groth patents, which have recently been tried on a less extensive scale by Messrs. Tebbitt Bros., also of Bermondsey. Here, a circular vat (of somewhat smaller dimensions than the drums of the British Tanning Company), is provided, with a central shaft and eight strong arms of wood, four at the top and four at the bottom. On these the hides are firmly fastened, and the whole revolves like a huge paddle, the vat being stationary, like a brewer's mash tun. At opposite ends of a diameter, two vertical strips of copper are placed against the sides of the vat, and a current of about 12 amperes is passed. Here there is no appreciable heating, and, of course, no pressure. The hides, so far from being continually churned together, are not even subject to the ordinary daily handling, but remain strained flat during the whole operation. In stiffness and thorough tanning the resulting butts are admirable, and apparently are better adapted for boot soles and purposes requiring a hard leather than that now being produced in the rival process. The copper electrodes waste away, as might be expected, but the British Tanning Company can discover no injurious result, nor can they detect its presence in the leather. Messrs. Tebbitt Bros., on the other hand, partly attribute the colour of their leather to the presence of copper and propose to use an alloy in its place, though we should imagine that carbon electrodes would overcome this difficulty. In specimens of the leather manufactured by this latter process, which we have inspected, the colour was much darker than that of the former, but we understand that the butts were tanned by a prepared extract, which is well known gives a darker colour than when a bark liquor is employed. One would imagine that in the Groth process the stretching of the pelts upon the wooden frames would facilitate a regular and uniform tanning, while in the alternative process the beating and flapping of the loose hides against one another and the sides of the revolving drums would have a tendency to soften the leather.

It seems a pity to ask too much of so promising a system. To reduce the time at one bound from many months to a few days is to spur a willing horse. Messrs. Tebbitt Bros. prefer to feed the hides with a weak liquor first, and are satisfied if the tanning is complete in two or three weeks. A strong liquor acts at once on the outer surface, and prevents the process from extending to the middle of the hide, and though we did not observe that this was the case at the British Company's place, we think that another fortnight in an ordinary pit would give greater firmness to their butts. The whole economy is one of time—there are no complications of new or cheaper chemicals, or utilisation of waste products; indeed, there is the introduction of motive power and electric machinery; but the advantage consists in the reduction of the large idle capital which lies in the tanner's yard in the form of costly liquor and half-tanned leather, besides the possibility of a rapid turnover and economy of space. The amount of energy expended in electricity is very small; the British Tanning Company use the current for twelve hours out of forty-eight, and its cost for the half-ton of hides tanned per drum at 8d. per Board of Trade unit would be only 3s. 4d.

More than forty years ago Peter Barlow wrote:—"Of late years considerable changes have taken place in the modes of tanning, so that this operation, which a few years ago took several months to complete, can now be done in as many days;" but he goes on to say,—"the leather, however, made by this hastened process is considered to be less perfect than by the old method, an opinion which is supported by many eminent tanners and scientific men, among whom may be mentioned Sir Humphrey Davy." While the former part of this quotation exactly expresses the result of the electric methods of tanning, we hope that history will not repeat itself, but that we have in these processes the beginning of a new and important industry. In the application of electricity to any industry, considerable time must necessarily elapse before "the trade" will give way its prejudices against a new process, and when, as in this case, there are alternative schemes before the public, the delay is likely to be prolonged by litigation. We believe that both processes are capable of yielding a valuable commercial leather, and that the manufacturers who adopt the new method will find that there are many advantages both in time, labour, and space over the older methods of tanning.—*Industries.*

THE PREPARATION OF CRYSTALLIZED EGG ALBUMEN.*

BY F. HOFMEISTER.

IN the course of investigation upon the behaviour of albuminoid bodies towards saline solutions, the author has repeatedly made observations indicating that the animal albuminoid substances which have not hitherto been obtained crystalline are not devoid of crystallizability. As the result of experiments directed especially to that object, he reports that he has worked out a method for obtaining egg albumen in a crystalline condition.

Fresh white of egg, free from yolk, is beaten into a fine froth with a good whisk, and allowed to stand for twenty-four hours. The nearly clear thin liquid solution of white of egg that collects at the bottom is then poured off from the froth, and treated with a cold saturated neutral solution of ammonium sulphate, in order to separate globulin. The resulting precipitate is filtered off, and the perfectly clear liquid, containing saline matter, is left to evaporate at the ordinary temperature in a wide flat-bottomed dish. After some days there is deposited at the bottom a layer of a finely granular white, sometimes yellowish or reddish coloured precipitate, which, under the microscope appears to be composed of tolerably large, transparent light refracting spheres or spheroid aggregates, without radiating or stratified structure (globulites). The thin membrane that covers the surface consists of the same form elements. When all increase of the precipitate upon further evaporation ceases to be perceptible, it is filtered off, and in this way almost the whole of the albumen is obtained in the form of a coarsely granular, pure white or slightly-coloured mass, completely soluble in water, which can be pretty well freed from mother-liquor by pressure. In order to purify this further it is dissolved in a semi-saturated solution of ammonium sulphate, and again left to evaporate spontaneously, and the operation is repeated as long as the albumen separates in globulites.

Usually in the third or fourth separation, by microscopical examination, fine needles may be seen mixed with the globulites, and upon further standing these rapidly increase, partly at the expense of the globulites present. The needles appear sometimes isolated, and sometimes in stellate groups. Frequently it is observed that the globulites, out of a crystalline nucleus contained in them, are gradually changed into a stellate group.

If when the beginning of crystallization becomes perceptible the shallow dish be covered with a glass plate, so as to moderate the evaporation, the greater part, or sometimes the entire mass of the albumen obtained gradually in the form of needles or thin oblique-angled plates. Mostly, however, a portion of the albumen that has separated in globulites resists this change. Neither is this object obtained by re-crystallization in the manner described, probably because the evaporation, even at the ordinary temperature, always goes on too rapidly, and especially too unequally. When this stage, however, has once been reached, a complete conversion into crystals is easily produced if the filtered and pressed precipitate, redissolved in a semi-saturated solution of ammonium sulphate, be filled into a tube made of parchment paper, well closed at both ends, and laid in a dish containing a semi-saturated solution of ammonium sulphate, so that it is everywhere surrounded by the liquid. The increase in concentration of the external liquid withdraws water very gradually and uniformly from the albumen solution contained in the tubes. If the albumen be already very pure it separates them directly in tables; or if there be

first a formation of globulites these are soon completely rep needles or fine plates.

For the purpose of more rapid purification it would appear on the one hand to filter off and remove the portion that separates in globulites, because in this way some difficultly soluble impurities are separated; and on the other hand in the crystallization not to a evaporation to go so far that the separation of crystalline ammonium sulphate begins, because, according to the author's experience, the portion last to separate possesses only a small disposition to crystallize. The separated crystalline mass can be advantageously freed from mother liquor by washing it with a solution of ammonium sulphate of the same density as the liquor. In order to avoid loss, however, washing should not be too prolonged. The albumenoid body thus obtained proved upon close examination to be identical with the egg albumen, as prepared by Starke. This was only what was expected, because in the preparation other white of egg substances the character of albumen were not separated. The condition of the egg—apart from the easily removed globulin—contains egg albumen as the single albumenoid body present in considerable quantity looked upon as very favourable to its crystallization.

Unfortunately the author did not succeed in bringing to crystallization a solution of the crystallized white of egg freed from salt by dialysis. This and the closely connected question whether the crystalline albumen prepared consisted simply of albumen or, what he considers to be probable, a compound of it with ammonium sulphate, he has been compelled by circumstances to leave undetermined for a time.

CROP AND STOCK PROSPECTS.

PROFESSOR MALDEN, in a letter to the *Times*, states that "Last year at this season there was a very luxuriant growth of grass and corn in most districts; as wet weather continued the crops became over-rank, and the wonderful promise of May was disappointed, for the grass, though plentiful, was poor, and cattle did little good on it, while that which was mown for hay has generally proved so valuable for feeding as usual. Except in a few districts, the yield of corn was considerably below the average before harvest. Last year's growth was unhealthy; while, so far as I have been able to see from visits during the week or two to the gravels of Berks, the heavy loams of Norfolk and Lincolnshire, the mixed soils of Beds, and the chalks of Hants, this year's growth is most healthy. Good plants are to be met with everywhere, and, with average weather, bid fair to yield better than they have for years. The grass is not so healthy as last year, but the cattle are doing so well that, though the stores have been bought in at high prices, they will probably clear the when they are fat, which is more than looked probable at on the whole. There is an abundance of sheep-keep everywhere, and stock is hardly falling in price in the face of it. Mangolds are coming up

LAYING PIPES UNDER WATER.

MR. F. S. PECKE, a civil engineer at Watertown, U.S.A., has accomplished in a very simple, cheap, and expeditious manner what is usually a difficult and expensive operation—the laying of a line of pipe in deep water. He had occasion to lay nearly 1,000 ft. of suction pipe at Rouse's Point. The water was needed for irrigation purposes, and as it was found that water near the shore was more or less impure, it was necessary to place the inlet at a considerable distance out in the lake. He purchased for the purpose a pressure pipe of 8 in. diameter, manufactured by the Spiral Weld Co., at East Orange, N.J., and used for couplings cast iron, weighing, with bolts and gaskets, about 65 lb. to the pair. At the end of the first length, he pushed it out on the surface of Champlain, and connected the second length, pushing this out until the whole line was coupled. It then presented the appearance of a line of 8 in. pressure pipe nearly 1,000 ft. long, with a displacement of only 3½ in. of its diameter. When the whole length had been connected the line was towed to position, the plug at the end removed, and the pipe sank easily in 16½ ft. of water without breaking a joint or receiving any injury. No buoys or floats were used in the operation, and no apparatus of any kind. It is now in use as the suction of a steam pump, and gives perfect satisfaction. Work of this kind usually involves the use of expensive troublesome flexible joints, and Mr. Pecke's neat and inexpensive method is worthy of record and of imitation under like conditions. It is obvious, says *Engineering News*, that this could hardly have been done with cast iron pipe, on account of its rigidity and liability to fracture.

OF PLATES OF STEAM BOILERS.

BY THOMAS T. P. BRUCE WARREN.

Corrosion of the iron plates of a steam boiler is due to two causes; in one case the corrosion, indicated by pitting above the water line, and in the other case by surface covered by incrustation or deposit. In both cases marked absence of uniformity of corrosion, some parts being more affected, whilst others in the same boiler and in the same liquid remain intact. This has been explained by the peculiar character of the plates, due either to chemical differences.

It requires no great amount of chemical skill to determine these factors operate in shortening the life of a boiler. It appears to me to have escaped the attention of writers who deserve mention. It is well known that a rolled plate has a "skin" or surface which resists oxidation. If we scratch or file, the new surface is rapidly coated with exposure to damp air. If we protect with a varnish the corrosion is not perceived. If a freshly-rolled plate remains intact, whereas the edges rust in a very short time, a piece of sheet-iron be immersed in dilute acid, the corrosion with what is known as the natural skin, resists the acid, whilst the recently-cut surfaces are speedily

attacked, due to a difference in the electrical relation of one being much more electro-positive than the other. The corrosion of pitting, which is not only local, but, in some parts, is serious, can be explained in the same way. In the construction of a boiler there are several operations which affect the form of surface; the rivets, the holes, whether drilled or punched, all introduce an individual function in the wear of the boiler. The natural skin of an iron plate, if partly removed, is a surface which is electro-positive to the other parts. Immersed in a corrosive liquid, the parts of the plate which are actually assist in the destruction of the parts which are negative; hence it is that pitting is promoted when it

occurs. It seems to be the entire removal of the surface after it has been pitted, then ensure a uniform surface, when alteration is less likely to lead to local chemical action.

The magnet for determining inequalities in a boiler is a very problematical, but the difference of potential between parts immersed in the same liquid, as might be observed by a galvanometer, would reveal the existence of chemical differences of structure which would be favourable to

proposed to use zinc as a protection against corrosion; by rendering the boiler surface electro-negative, we prevent corrosion, but, unfortunately, the instructions given for doing so are very misleading. In some cases pieces of zinc are simply thrown on the surface as they remain clean and are in contact with a preservative action of the zinc is ensured, but with mud or boiler deposit, they are shielded from the water line, we are more likely to prevent corrosion of the iron being electro-negative to zinc.

of the zinc being greatest at the points of suspension, far away and fall into the deposit, where it becomes, in a chemical sense, lost, but so long as it remains suspended, at the points of attachment keep the contacts clean. Remember that the greatest loss of zinc is where the metallic contact is made; that by increasing the area of the zinc plate, so long as contact is constant, we are doing little or no good. The areas of contact of the two metals, so as to ensure advantage, when once determined for any particular case must be rigidly enforced. When a boiler is cleaned out to "put the zinc back again;" clean contacts, or clean the zinc plate if worn, should never be neglected. The zinc plate should be entirely renewed. It is well-known that it should be allowed to introduce an electro-positive boiler-plates. Spelter or sheet-zinc frequently contains a large amount of lead; in time the zinc dissolves away, leaving a lead; we are then in a fair way of doing more harm than good to boiler plates, in spite of the solubility of chloride of

It is recommended for keeping a boiler clean, and here, I think, a great deal of carelessness has been introduced by writers on the subject. One-half of a boiler is in contact with a hot solution of one-half of a boiler is in contact with a hot solution of the other half not; the condition of the two parts of the boiler, as regards liability to corrosion, must be too evident to

The unequally heated parts of a boiler will require a difference of potential proportional to the energy of the liquid, and here we have probably an explanation for the increased activity of alkaline solutions in removing scale.

From these considerations it will appear that if we can keep a boiler electro-negative, by an independent source of electrification, to any destructive agency which might arise in the boiler, we might reasonably hope to prolong its life.—*Chemical News*.

THE TENDERING OF TISSUES BY IRON MORDANTS.

THIS was the subject of a recent communication to the Société Industrielle de Mulhouse, by M. Jeanmaire. Every cotton tissue, on being immersed in iron mordant, is weakened after a shorter or longer contact. The degree of the change increases with the concentration of the mordant and the temperature. The influence of an acid pre-existing on the tissue is nil, provided it has no oxidising action. If the tissue shows no trace of weakening before the mordanting, the degree of weakening by the iron will not be greater than that produced on neutral tissue, whatever be the nature or quantity of the acid or the manner of drying. In certain cases the tissue is protected by the mordant itself from a subsequent change which the acid might eventually produce. If the tissue is weakened more or less already before the application of the mordant, the total weakening will be equal to the one originally observed, increased by that produced by the mordant on unimpaired tissue. An alkaline discharge increases the extent to which the fibre is attacked by the iron mordant.—*Textile Mercury*.

NOTES FROM KUHLOW.

SULPHUR.—This product is undoubtedly one of the most important articles in the chemical trade. In Germany in recent years it has mainly been extracted by the regeneration of sulphur forming the residuum in the manufacture of Leblanc soda, which is accumulated in enormous heaps at almost all works. The Schaefer process rendered it possible to regain the sulphur from the residuum, and in this way chemical manufacturers were enabled to make a profit where it would otherwise have been impossible. An occurrence of some interest from a commercial point of view thereupon took place. In the course of a few years the prices of raw sulphur in Sicily declined so heavily, and freights were reduced to that extent, that it became cheaper to bring Sicilian sulphur to Germany than to regenerate the sulphur left over from the Leblanc process. In consequence, Sicilian sulphur is almost alone found in trade. Extensive experiments are being conducted in Upper Silesia with the object of extracting sulphur, flowers of sulphur and liquid sulphuric acid from the torrefied gases escaping from sulphuric acid in the manufacture of zinc.

THE LIEBENWERDA BRIQUETTE WORKS.—The lignite used for the briquettes is brought to the works by means of a wire rope railway. The speed is $1\frac{1}{2}$ metres per second. Some seventy-five tons of lignite are brought into the works inside twenty-four hours. Each truck contains about seven cwts. After the lignite has passed through several wood and iron bars it falls into a rolling mill, where it is completely pulverised. The lignite, which is then in dust form and contains 50 per cent. of water, is thereupon transferred to a drying furnace (steam drying machinery), where it must pass through nineteen divisions lying one above the other, in order that the moisture may as far as possible be evaporated. It is then placed in the pressing machine which has a horizontal motion, and turns out about 120 tons of briquettes daily. The briquettes are sold on the spot at about £4. per ten tons. The coarse lumps of coal that cannot pass through the bars are collected and sold as fuel at about 25s. per 10 tons at the works. An electric light machine provides the necessary illumination for night work. The wire rope railway connecting the works with the mines is 6,150 metres long, and the journey lasts about an hour.

AN IMPORTANT WIND MOTOR, with pumping works, has just been constructed for the Griefswald waterworks by Messrs. Friedr. Filler & Hinsch, of Eimshüttel, proving, in a convincing manner, the applicability of such motors for the purpose in question. The motor drives four pumps, and serves for supplying the town with water. A very favourable impression is made by the gigantic dimensions and elegant construction of the whole. The motor itself, is 12.20 metres high, and is fixed on an iron tower 20 metres in height. With a speed of wind of 4.5 metres, it develops a power of 25 horse-power, and raises in an hour, 162,000 litres of water about 15 metres high. The work is a credit to Hamburg industry, in general, and to Messrs.

Friedr. Filler & Hinsch in particular. It may be mentioned that the firm has carried off no less than 24 awards.

FARBSTOFF-IMPORT-ACTIEN-GESELLSCHAFT, VORMALS BÖSENBERG & JANKE, HAMBURG.—A company has been formed at Hamburg, under the above title, with a capital of 500,000 mks., for the purpose of acquiring the import business in tanning and dyeing materials of the firm of Bösenberg & Janke, and the quebracho and dyewood mills, situated at Blankenese, on the Lower Elbe, and belonging to the same firm. The management of the business will, in the first instance, be carried on by Messrs. H. Bösenberg, and A. Janke. The prosperity of the new enterprise appears assured, from the fact that the company has joined the Sales Syndicate of the Hamburg Quebracho Mills.

BLECHWALZWERK SCHULZ KNAUDT ACTIEN-GESELLSCHAFT, ESSEN.—As appears from a notice of the Royal *Amtsgericht* at Essen, the above-named company has empowered Mr. Carl Ohly to sign, per procuratorem, such signature, to be accompanied by that of a director or of another procurator.

SEPARATION OF THE THREE XYLENES OF COAL TAR.

SULPHURIC acid containing of 80 per cent. of H_2SO_4 still acts on meta-xylene, whilst diluted to contain about 84 per cent., its action on para- and ortho-xylene ceases. Ordinary sulphuric acid (93 to 95 per cent.) acts, therefore, on meta-xylene, until in the mixture the ratio of sulphuric acid to water is about 80:20. In para- and ortho-xylene the action will have already ceased when the ratio attains 80:16. This happens, for instance, as soon as 202 grms. of sulphuric acid (93 per cent.) have dissolved 100 grms. of meta-xylene, or as soon as 233 grms. of the same acid have dissolved 100 grms. of para- or ortho-xylene. Hence it follows that to a sulphuric acid saturated with meta-xylene, about one-sixth of its original weight of new acid may be added without the mixture being rendered inoperative for dissolving para- and ortho-xylene.

The crude xylene worked with contained generally more than 60 per cent. of meta-xylene. The treatment with sulphuric acid was carried out in a cast-iron cylinder with a stirring apparatus, or for analytical purposes, in glass flasks with good shaking apparatus. The temperature during the operation rose as high as 80°. Under these conditions the sulphuric acid, if added in sufficient quantity, attacks meta-xylene only. In the selection of the raw material care should be taken to select a product which does not begin to distil under 136°, otherwise the toluene will afterwards render the para- and ortho-xylene impure. Good results have been obtained with products that began to distil at 136°, and of which 90 per cent. had passed over at 145°. The raw material should, before separation, be repeatedly washed with small quantities of sulphuric acid (which is to be kept cold) till it becomes not more than slightly brown.

Meta-xylene.—It follows from these remarks that the total amount of meta-xylene can be separated from the raw xylene as sulphonic acid in one operation, by means of sulphuric acid, the quantity of which is determined by a preliminary trial.

The complete removal of the meta-xylene is the object of a subsequent preparation of pure ortho-xylene. One kilo. of washed raw xylene is put into a (graduated) flask, which can be mechanically shaken during several hours, while the quantity of sulphuric acid, sufficient to dissolve 60 per cent. of meta-xylene, calculated as shown above, is gradually added. After allowing it to settle it will not often be found that too little of the substance has been dissolved—that is, that the meta-xylene present was less than 60 per cent. If the solution was normal, a further addition of one-sixth of the sulphuric acid employed will, in most cases, dissolve a few more per cents. If by this the decrease of hydrocarbon is made greater by nearly 60 per cent., the addition of sulphuric acid is, of course, to be repeated. The necessary amount of sulphuric acid, roughly estimated in this manner should be controlled by repeating the experiment.

One-third of the quantity of acid thus determined is added to the raw xylene in a suitable stirring apparatus; the remainder and about one-sixth of the acid in excess is added after some time. The influx is to be so regulated that the temperature during the reaction does not exceed 80°. Under these conditions all the meta-xylene passes into solution exclusively as 1, 3, 4 meta-xylenesulphonic acid. After allowing it to settle for some time the acid is drawn off. It still contains 2 to 3 per cent. of hydrocarbons mechanically dissolved; most of them separate when the acid is diluted. The mixture of acids is, by the addition of water, brought to a specific gravity of 1.4. A considerable rise of the temperature above 100° is of direct advantage, as it prevents a too early crystallisation of the sulphonic acid, so that the mechanically dissolved hydrocarbons can separate at the surface. At the same time the greater part of the sulphonic acids of the olefines of

the raw xylene, which are present in small quantities, is decomposed. The sulphonic acids of the xylenes begin to decompose only slightly at 150°.

On cooling slowly, the whole mass consolidates to a firm mass of crystals of the α -meta-xylenesulphonic acid. The mother-liquor obtained by treating the crystals in a centrifugal machine, separates into two layers, a lower one containing nearly pure sulphuric acid gr. 1.57-1.60, and above it a layer of sulphonic acid, for the most part still in a liquid state. From this, repeated crystallizations of α -xylenesulphonic acid are obtained after destruction of the olefinic acid still present by heating, and subsequent addition of sulphuric acid.

If the pure hydrocarbon is to be regenerated from the sulphonic acid, the latter may be decomposed, quantitatively, with water in a boiler at 220°; under pressure. In the case of meta-xylene, carefully-directed dry distillation of the ammonium salt is also possible, but not in the case of para- and ortho-xylene. The meta-xylene is acidulated a little with sulphuric acid, and will then give a higher yield than by dry distillation of the free acid, without any other secondary decomposition, except a partial carbonization. The yield by distillation of the ammonium salt, amounted to 80-90 per cent.

Para-xylene.—The remainder of hydrocarbon, separated from meta-xylenesulphonic acid is, in the same stirring apparatus, at treated with an excess of sulphuric acid. The elevation of temperature, if necessary, supported by indirect steam, and is to be kept for some time at 80°; the whole substance, except about 5-10 per cent. then dissolves. The mixture of acids is drawn off, and again diluted in the case of meta-xylene, and left to crystallize in a cool place. The mass at once separates into two layers, of which the lower, containing the sulphuric acid, considerably exceeds in quantity that of the xylene, but also contains no appreciable quantity of dissolved hydrocarbons. The upper layer coagulates to a pulp of needles of the α -xylenesulphonic acid, in the still liquid ortho-xylenesulphonic acid.

The para-compound crystallizes completely, and may be obtained pure, by means of a good centrifugal machine that the hydrocarbon isolated from it, melts at 5°-7°. As the sulphonic acid is deliquescent, a thick and thorough separation of these crystals is essential for subsequent preparation of pure ortho-xylene.

Toluenesulphonic acid behaves like para-xylenesulphonic acid, easily distinguishable from it externally, and, in the above operation renders the para-xylenesulphonic acid impure, if the amount of toluene in the raw xylene be considerable.

If a greater purity in the para-xylene be desired, the sulphonic acid freed from mother-liquor by the centrifugal machine, is to be dissolved in water, and re-crystallized by addition of sulphuric acid. Barium salts have not rendered any particularly good service in separation of the xylenes. For the preparation of absolutely pure para-xylene the beautifully crystallizing sodium salt of the sulphonic acid, obtained from the calcium salt, is most preferable.

The only way of isolating the para-xylene is by decomposing it in the pressure boiler, where decomposition will take place quantitatively; the sodium salt must previously be acidulated. A distillation of the acid, or of the acidulated ammonium salt, is impossible, scarcely 20 per cent. of the theoretical product obtainable.

Ortho-xylene.—The mother-liquors of the para-xylenesulphonic acid contain, indeed, all the ortho-xylene, but do not, by simple distillation, produce any hydrocarbon of sufficient purity. It is better to form first the lime salts, and to prepare the sodium salts, which ortho-xylene, are particularly easy to obtain in fine crystals, and not even to be re-crystallized in order to furnish, after decomposition a pure hydrocarbon with a constant boiling point between 143° and 145°. In experimental decompositions the sodium salt behaves like the para-compound. With dilute sulphuric acid or hydrochloric acid the decomposition in the pressure-boiler takes place quantitatively. Dry distillation produces even worse results than with para-xylene.

The portion of raw xylene which remained undissolved in sulphuric acid consists of paraffins, and not polymerized terpenes. A hydrocarbon, with its boiling point between para- and ortho-xylene, is present, according to the author's experiments.

After removal of the meta-xylene from larger quantities of mixture by means of sulphuric acid, the two hydrocarbons might, advantage, be obtained sufficiently pure for most purposes by fractional distillation with a difference of 7° in the boiling point. The sulphonic acids become turbid on the addition of water, not on account of the separation of the excess of sulphuric acid, but because, besides a few aromatic hydrocarbons, they contain mechanically dissolved olefines and the like, which separate out on dilution mentioned under meta-xylene. If the operation were conducted with sulphuric acid only, the mechanical separation from these accompanying bodies is to be effected, if necessary, by dilution or heating before the preparation of the hydrocarbons can take place. If sodium sulphonic acids are used, these impurities are not taken into account.

—Chem. Zeitung.

CARBURETTED WATER GAS.

remembered that a few months ago two workmen lost their lives at the Leeds Forge in consequence of inhaling water gas employed at these works for welding purposes. The accident naturally given rise to a strong prejudice against the use of water gas, and various efforts have been made to overcome so serious an objection to its use for manufacturing or other purposes. Among these efforts Mr. Fourness, of Manchester, has been carrying out experiments in the direction; and he appears to have been successful in his object in view, inasmuch as he has patented a process for the production of a gas, which he claims not only destroys all its poisonous properties, but produces a gas of high illuminating power. This gas, as is well known, is produced by steam coming in contact with red hot coke or other fuel, the result being the giving off of water gas. With the water gas thus produced Mr. Fourness produces a gas while the gas is in a heated state—a thorough heating of the two being thus secured, and the water gas effectually

By this process, as already stated, the poisonous carbon gas is destroyed, and to the water gas is imparted high properties; gas manufactured by this process having been 22-candle power. Mr. Fourness claims that gas which is suitable for welding and heating purposes as heretofore, can be employed both for lighting and domestic purposes, manufactured by his process at a cost not exceeding 6d. per foot, as compared with 1s. 5d. per 1,000 cubic feet, which will be the cheapest rate at which coal gas is produced. The gas thus manufactured by the Fourness process is very different from ordinary coal gas, so that any escape can be readily detected while another distinguishing feature is that the water gas is rendered permanent, and may be stored in holders for a long period without decomposing. So far Mr. Fourness has secured his gas in small experimental apparatus; but we have the opportunity of inspecting the product, and certainly, so far as safety properties are concerned, it compares very favourably with ordinary coal gas. If Mr. Fourness's calculations as to cost are correct, it certainly promises to be an important step in producing a cheap and clean illuminant.—*Journal of Gas Lighting.*

**SS ENAMELLED STEEL CASKS FOR
RS AND MANUFACTURING CHEMISTS.**

named steel casks are now extensively made in America : in breweries and processes of a similar nature. They are used as filters in glucose and sugar refineries, evaporating works and other purposes, and to replace wooden tubs in breweries, and have been widely adopted by the latter in with the well-known vacuum system of ageing and ripening body of the cask is composed of a series of welded steel in thickness, with right angle flanges at each edge. The rimmed from single sheets of steel $\frac{5}{8}$ in. in thickness in a hydraulic press, and the inside is coated with a glass enamel the steel at a high heat. These sections and heads are riveted together with $\frac{5}{8}$ in. bolts, two inches apart, and the rivets are reinforced by continuous steel washers $\frac{3}{8}$ in. thick. Between the sections is a very thin asbestos and plumbago packing, odorless and fireproof. The height of each ring is 30 in., and the diameter is 42 in. The heads are dished 10 in. and given a smooth, beautiful form in the hydraulic press. Each ring is made of a single sheet of the best homogeneous steel, 35 in. wide, in circular form, when the ends are welded together by a continuous weld, making a continuous weld 35 in. long of $\frac{1}{4}$ in. steel. The cask is then placed in a flanging machine, and a flange is spun on the ends at right angles $2\frac{1}{2}$ in. wide. The welding and flanging of the cask is beautifully done, and are triumphs of fine work in steel. The cask is then divided into sections, together with four rings or sections, they make a cask fit for 110 barrels, having the strength of steel outside and the continuous glass inside, and are odourless, tasteless, acid-proof, and fireproof. They are also air-tight under both internal pressure. They have cast iron legs made adjustable to the inequalities of the floor, and are fitted with convenient locking or other openings. For the purposes designed, they are both unequalled. Each section, including the heads, is enamelled while heating in a furnace specially constructed for the purpose, by which the enamel is burned on uniformly at all points. The cask can be drilled at any point without chipping the enamel. It shows a union between the steel and enamel of excellence, which is not found in the case of enamelled cast

THE HORSE-POWER OF BOILERS.

IT should be remembered that the horse-power for boilers is largely a matter of arrangement and varies according to the nature of the work to be done by the steam generated. As the horse-power of an engine is usually empirically figured from the area of the cylinder, so is the power of boilers not unfrequently estimated from their size merely, without regard to those other conditions which in practice are all important—such as setting, size of grate, heating surface, rate of combustion, etc. To meet some of these difficulties in the way of fairly estimating, in comprehensive fashion, the comparative horse-power of different boilers, it is considered best, on the whole, to reckon the power of a boiler by its capacity of evaporating water under given conditions. It is found that with a moderately good engine 30 pounds of water (raised to its equivalent in steam) will develop one horse-power (indicated) per hour. Bearing this fact of practice in mind the United States experts have agreed to regard the nominal horse-power for a boiler as an evaporation of 30 pounds of steam (about one-half cubic foot) per hour into steam at 70 pounds steam pressure, the water being fed into the boiler at 200 degrees Fahrenheit.

As will be seen, the above figuring is confined to the boilers. When we convey steam from the boiler to the engine and seek to convert it into power, under control and useful, we are confronted with a new set of problems. These are too numerous and complex to be considered here. Briefly, as illustrating what we have to say, it is found that the ordinary slide-valve engine requires the evaporation of between 50 and 60 pounds of water per hour to produce one indicated horse-power, whilst large condensing engines require about 20 pounds, and compound condensing even less. Turning to another and important aspect of the subject, we are indebted to Jas. E. Denton, M.E., professor of experimental mechanics at the Stevens Institute of Technology, Hoboken, N. J., for some useful particulars upon the subject of boilers in connection with heating purposes, and as his words have the merit of being at once simple and practical, we produce them here :

“ For heating purposes the horse power of a boiler is measured by the cubic feet of space it will heat ; the cubic feet of space is given a radiating surface in the proportion of 1 square foot of radiating surface to about 100 cubic feet of space, and the boiler is given heating surface in the proportion of 12 square feet of radiating surface to 1 square foot of heating surface in the boiler, assuming that each square foot of the latter can evaporate 3 pounds of steam per hour at about 70 lbs. pressure, and finally the boiler maker sells the boiler on the assumption that each 15 square feet of heating surface is a horse power, which, evidently, is equivalent to $15 \times 3 = 45$ pounds of steam for a horse power. For steam heating practice, therefore, a 100 horse power is practically expected to be one that will evaporate 4,500 pounds of water per hour, and should a boiler be tested and rated at 100 horse power on the 30 pound basis, independently of the kind of work it was to do, that boiler, if used for steam heating, might fail to heat as large a space as steam heaters had been accustomed to heat with a 100 horse power boiler.”

From what we have said it will be seen that the horse power of a boiler is subject to considerable variations, depending largely upon the purposes for which it is required, as also upon the engines it has to feed.

THE RECKLESS USE OF EXPLOSIVES.

ONE of the most fruitful sources of accident in the use of dynamite, says *The Times*, is the thawing of that explosive in order to render it plastic and fit for use. It is a peculiarity of dynamite that it solidifies at the comparatively high temperature of about 40° Fahrenheit, when it becomes inert. To thaw it tin warming pans are, or ought to be, used, although they are not always provided, as they undoubtedly should be. But provided or not, it not unfrequently enters the heads of labouring miners to thaw the cartridges of dynamite in their own wilful way. And they are very ingenious in devising methods of doing this in the most criminally unsafe manner possible. A reference to the reports of her Majesty's inspectors of explosives reveals the fact that from the winter of 1871-2 to February 18 last no fewer than 63 accidents have occurred in the United Kingdom through the improper thawing of dynamite. As a result of these accidents 50 lives have been sacrificed, whilst in addition 76 persons have been more or less seriously injured. These reports also describe the methods by which these inevitable accidents are brought about, and which are either due to ignorance or to sheer recklessness. As a matter of fact, instances are recorded of workmen frying, boiling, toasting, and baking dynamite with the view of thawing it. Up to February last the idea of steaming it like a potato does not appear to have occurred to any one. This method, however, was adopted at Colwill quarry, near Egg Buckland, Devonshire, with the result that two men were killed. In this case the practice was to use an old paint can half filled

with water and placed on a sledge hammer head over the smithy fire. Over the can was placed a piece of canvas, varied with an old straw hat, and on the canvas or in the hat the cartridges were laid to thaw. The process of thawing was being carried on in this way when an explosion occurred which killed the two men. What had happened was that in previous heatings of cartridges some of the nitro-glycerine had exuded from the dynamite, and had filtered through the sacking or the straw hat into the pot. Being heavier than the water the nitro-glycerine sank to the bottom, and upon the temperature reaching the exploding point (350° to 400° Fahrenheit) the catastrophe occurred. In the evidence given at the inquest it was shown the agent who supplied the dynamite took no steps to acquaint the purchaser of the proper method of thawing dynamite nor to inquire as to his knowledge of the process. Hence, Major Cundill, R.E., in his report on this accident does not hold this dealer blameless. With carelessness on one hand and recklessness on the other it is not easy to see how these malpractices are to be stopped. A salutary lesson might, however, be taught if some responsible person, not an unlucky, ignorant labourer, were tried for manslaughter.

PRIZE COMPETITION.

A LITTLE more than twelve months ago, one of our friends suggested that it might be well to invite articles for competition, on some subject of special interest to our readers; giving a prize for the best contribution, he at the same time offering to defray the cost of the first prize, and suggesting a subject in which he was personally interested.

At that date we were totally unprepared for such a suggestion, but on thinking over the matter at intervals of leisure, we have come to think that the elaboration of such a scheme would not only prove of benefit to the manufacturer, but would go some way towards defraying the holiday expenses of the prize winner.

We are therefore prepared to receive competitions in the following subjects:—

SUBJECT I.

The best method of pumping or otherwise lifting or forcing warm aqueous hydrochloric acid of 30 deg. Tw.

SUBJECT II.

The best method of separating or determining the relative quantities of tin and antimony when present together in commercial samples.

On each subject, the following prizes are offered:—

One first prize of five pounds, one second prize of one pound, five additional prizes to those next in order of merit, consisting of a free copy of the *Chemical Trade Journal* for twelve months.

The competition is open to all nationalities residing in any part of the world. Essays must reach us on or before April 30th, for Subject II, and on or before May 31st, in Subject I. The prizes will be announced in our issue of June 28th.

We reserve to ourselves the right of publishing the contributions of any competitor.

Essays may be written in English, German, French, Spanish or Italian.

WASTE ACIDS FROM GALVANISING WORKS.

ALL of our readers who are engaged in the iron trade are aware how difficult it is for the manufacturers of galvanised iron to deal with the spent acids which have to be got rid of during the process. In various parts of the kingdom this difficulty has brought manufacturers of galvanised iron into collision with the local authorities in connection with the contamination of streams and rivers, and simple though the subject may at first sight appear, it is undoubtedly one of the greatest evils with which manufacturers in this class of business have to contend. We have, therefore, pleasure in calling attention to the result of experiments which have for some months past been carried on by Mr. Thomas Turner, lecturer on metallurgy at Mason College, Birmingham. There are several systems in use at present, one of the best of which is the lime-purifying system. Under Mr. Turner's new process the waste liquor is merely boiled down to dryness, and the solid residue heated to low redness. Oxide of iron remains in the furnace, while free hydrochloric acid distils off, is condensed, and can be used over and over again. The new process differs from all preceding methods, in that it requires no chemical agents, that nothing whatever is thrown away, that no nuisance is made, and that a clear

profit is realised. As a result of experience it is found that the fuel will work three months without stoppage, that they only use 4 c of fuel to treat completely a ton of waste liquor, that the acid recovered is perfectly suitable for using over and over again, and that the iron recovered has a value which goes a long way towards the fuel used. The experiments have been conducted at a system perfected at the works of Messrs. Walker Bros., of Walsall, Netherton, one of the largest firms of galvanisers in Staffordshire. There is great need for some efficient system, otherwise the galvanising and sheet iron trades, which have immensely developed in the Midlands during the last ten or fifteen years, and which at present employ thousands of operatives and hundreds of thousands of capital, will cease to continue—as they have already begun to do—to drift to Lancashire, Bristol, the banks of the Thames below London, and other places on the coast, where the waste acids can be readily disposed of by allowed to flow out to sea with the tide.

[We extract the above from the *Engineer*. The account given of the process would have been more perfect if a description had been given of the vessel in which the waste liquor is to be boiled down to dryness.—Ed. C. T. J.]

A RISE IN BRIMSTONE IN AMERICA.

THERE has been a disposition for some time past, among buyers of Sicily brimstone, to refrain from purchasing, on a belief on their part that values were on a higher basis than the conditions of the market and the statistical position of stocks warranted, and the theory has been advanced at various periods, that prices sooner or later show a decline, in which event they would supply wants. Dealers, on the other hand, have as strenuously contended that there was nothing in the outlook to indicate lower value than they have in many instances warned buyers against "holding off" long, and the tenor of late cable advices has caused the dealers to have more than ordinary faith in their predictions of higher figures. (Circulars, which were received here on Saturday, proved conclusively that they have waited a little too long before effecting their purchases, and the result of their policy, they will be forced to pay higher prices in the market having materially advanced, since the date of our last issue, and the cables prognosticate a still further advance. The chief reasons assigned for the course of the market, are the high asking rates for freight, and the lack of supplies at the Sicily ports, there being said, a decrease of some 50,000 tons since January first, which has been brought about by circumstances previously noted in these columns. The circulars, it is asserted, regarding the stocks of Sicily, have been incorrect and misleading, and according to dealers, there is prospect of a "squeeze," for lots up to August shipment, parcelling this position being quoted a trifle less than those for shipment at that date, while the amount in store, of Sicily, being infinitesimal, relief from this quarter may be expected. True, there is some brimstone here, but this is also held at high figures and the question is not exorbitant. Taken altogether, the outlook for buyers appears rather blue, as the market has every indication of ruling for a considerable time to come, unless something unforeseen occurs, which seems hardly probable at the moment.

Trade Notes.

THE BRITISH ASSOCIATION: LEEDS MEETING.—The provisional arrangements have been made for the sixtieth meeting of the British Association, which will be held in Leeds during September next. Monday, September 1st, the Reception-room will be opened in the Victoria Hall. On Wednesday, the 3rd, at eight o'clock, the president will resign the chair in favour of Sir Frederick Augustus C.B., F.R.S., who will deliver the inaugural address. On Thursday, at eight o'clock, a soirée; on Friday, at half-past eight, a lecture by Professor Perry, F.R.S., on Monday, at half-past eight, a lecture; and on Tuesday, at eight o'clock, a soirée. The lectures will be given by C. V. Boys, F.R.S., and Poulton, M.A., F.R.S. The sections will sit daily under their respective presidents. A.—Mathematical and Physical Science, J. Glaisher, D.Sc., F.R.S., president. B.—Chemical Science, Prof. E. Thorpe, F.R.S., president. C.—Geology, Professor A. H. C. M.A., F.R.S., president. D.—Biology, Prof. A. Milnes Marshall, M.A., F.R.S., president. E.—Geography, Lieut.-Colonel Lambert Playfair, K.C.M.G., president. F.—Economic Science, Prof. Alfred Marshall, M.A., president. G.—Mechanics, Captain A. Noble, C.B., F.R.S., president. H.—Astronomy, John Evans, D.C.L., Treas. R.S., president. The afternoon of Saturday, September 6th, and Thursday, September 11th, will be devoted to visits and excursions to places of interest in Leeds and neighbourhood.

UNDER GREAT PRESSURES.—In the coal mines at Kladia, there are located two pairs of compound pumping form a notable plant. They drive double acting plunger in. stroke for one engine and 3 foot stroke for the other, speed of from 40 to 72 revolutions per minute. The shaft is 1700 feet below the surface of the ground, and they lift this whole head, doing the work with ease and safety. The pumps are the invention of Professor Rielder, Polytechnic Institute at Berlin, and the design has given remarkable results.

IN BEER.—There is a revival of the rumour that Nuxvomine is being used to give bitterness to beer, as a substitute for hops. It can be none other than an idle rumour, because no one is foolish enough to run the risk. He needs not to run the risk, in a gallon of beer, of picric acid, the bitterest of all, would make a bung-hole twist again, to say nothing of the consumer's mouth. If they would only keep out of his beer chamomile flowers, colombo root, burnt sugar, liquorice, etc., the consumer needs not to concern himself about the matter. When the beer is hard or sour, when it is thick and sticky, that is the place for it. When the beer is cloudy, there are products of a second fermentation and God knows what. But when the beer is clear the beer is pure?

USE OF BITTER.—It is not a new story this about the use of Nuxvomine in the manufacture of bitter beer. It doubtless had its origin in the bitter-making properties of the drug (1 part in 100 parts of water is still perceptible), and in the greatly increased value of it from India. But the latter is explained by its use as a poison for vermin, especially in Australia. The seeds are yielded by the Koochla tree (*Strychnos Nuxvomica*) which flourishes in Ceylon, on the Coromandel coast, and in India. Strychnine, so popular with our homoeopaths and native Asiatic practitioners, is the deadly poison in Nuxvomine—the same poison that is got from St. Ignatius's beans, and angostura bark. It is the dread arrow poison—the death of the South American Indians.

OF FRENCH COCHIN-CHINA.—Mr. Tremlett, the Consul at Saigon, in his report on the trade of Cochin-China for 1889, observes that crops were short and much suffering among the natives in consequence. This is not so apparent here as a large number of people find employment; but once from the capital the poorer classes have long been labouring for food. The rice exports last year were only 220,000 tons less than those of the previous year. The Straits, and the Philippines are the chief markets for Cochin-China taking more than half the total export. Last year trade with Japan in raw cotton began, which is likely to be of importance in view of the development of the cotton industry in that country. All the trade statistics for the year show a decline, owing to the inferior rice crop and partly to the heavy duties levied upon foreign imports, which French manufactures do not replace. The tariff continues to protect foreign goods, particularly piecegoods, which still weigh heavily upon the natives, upon whom falls the burden of duty. French manufactures offer little relief, not being suitable either in price or quality; the tax upon foreign tissues was increased upon July 1st, nothing more has been heard of a projected loan; it has fallen into oblivion, like so many others. The Consul is of opinion, that relief of some kind must be found for the future.

URING IN NATAL.—The Government of Natal, has issued regulations for the law to make provision for rewards, colonial manufacturing industries. Its two chief features are, the appointment of a Commissioner of Industries, and the offer of rewards, varying in amount from £100. to £1,000. for the establishment of new industries, of which, twenty are to be established. The amount of rewards extends from one-eighth to two-thirds of the output. The amount of the capital to be invested in the industry, from £500. to £25,000. The aggregate amount of capital to be invested, is £25,000. The principal industries which the Government wishes to build up are leather, woollen, and iron. The industries mentioned in the schedule, embraces woollen blankets, and rugs from colonial wool. The value of the output in one year and a half, is about £8,000., on which a bonus of £3,000. will be paid, while the amount of capital to be invested must be £15,000. Class 5 embraces tweeds, serges, and flannels from colonial wool. The amount to be invested is £7,500., and the value of the output and a half, must equal £5,000., on which a bonus of £3,000. will be paid by the Government. Class 6 embraces yarns from colonial wool. The amount of capital to be invested, is £5,000., and on the output of a value of £1,000. per annum, it will pay a bonus of £300. Natal is determined, if she promotes home manufactures.

A GLASS COMPANY'S OFFER.—The Sumner Glass Company, of Steubenville, has made a proposition to the business men of that place for an enlargement of the works which will double their capacity and semi-monthly pay roll. The company proposes to the citizens that if they will raise \$4,000. and present to them, they will immediately erect another furnace 85 feet high, holding 12 large pots, with accompanying lears, etc. This would give employment to 100 or 120 hands, and make the pay roll not less than \$1,500. per week. The entire cost of the improvement is about \$15,000., which the company is not able to raise from its own funds, but it can be accomplished with a little help from citizens. The money has been about all raised.

A GUSHER IN WEST VIRGINIA.—A Parkersburg, W. Va., press telegram announces that "the Johnson and Brockmier well, on the river bank at Belmont, which came in recently as a 750-barrel a day well, and which has been flowing about 500 barrels a day ever since, is now doing over 1,000 barrels a day. When it first came in, the drill had just merely touched the oil sand, and yesterday the drill was again dropped in the well and the sand slightly agitated. As a consequence the oily stream began spurting out at the rate of over 1,000 barrels a day, and is keeping it up. Nine other wells in the immediate vicinity are expected in at any time. Some of them are on the top of the sand."

METAL THAT MELTS EASILY.—A metal that will melt at such a low temperature as 150° is certainly a curiosity, but John E. White, of Syracuse, N.Y., has succeeded in producing it. It is an alloy composed of lead, tin, bismuth, and calcium, and, in weight, hardness, and colour, resembles type-metal. So easily does it melt that, if you place it on a comparatively cool part of the stove with a piece of paper under it, it will melt without the paper being scorched. Another peculiarity about it is, that it will not retain heat, and becomes cold the moment it melts. It is used in the manufacture of the little automatic fire alarms for hotels, and which give an electric alarm when the metal melts, owing to the rising of the temperature by fire.

INDIAN FORESTS.—According to the last official return on the subject, there were in India at the close of 1889 54,917 square miles of forest demarcated and reserved by the State. The area has increased especially since 1877-8. In that year it was only 17,705 square miles; in the following year it amounted to 40,425 square miles, in consequence of the energetic operations carried on in the central provinces. These latter have now the largest area of reserved forests of any province in India. It amounts to 19,712 square miles, Bombay coming next with 10,236. The areas elsewhere are:—In Lower Burma, 5,111, Bengal, 4,988, Madras, 3,727, North-Western Provinces and Oude, 3,727, Assam, 3,447, the Punjab, 1,535, and Berar, 1,059 square miles.

NEW COMPANY IN CANADA.—Gas and oil, natural gas and petroleum oil, are what the Wentworth Gas and Oil Company is principally after. This company, of which Messrs. Lewis Springer, Barton, R. R. Waddell, J. V. Teetzel, J. N. Waddell, P. C. Brown, and F. R. Waddell, Hamilton, are the provisional directors, want incorporation to acquire land, sink wells, and construct machinery thereon for the purpose of obtaining natural gas, and to lay pipes conducting the same to the city of Hamilton, also for purchasing refineries, plant and machinery, and buying, selling, and producing salt, crude petroleum, oil, etc. Their proposed capital is \$45,000., and they expect to buy a lot of property in a direct line with the "Well and Flew," whatever that is.—*Petroleum Topic.*

AN INDIAN NATIVE MINT.—Captain Temple, in an article on the coins of modern Punjab chiefs in the new *Indian Antiquary*, describes the Patiala Mint and the methods of minting practised there. The Mint, he says, is an ordinary Punjab courtyard, about 20 ft. square in the open part, entered by a gateway leading into a small apartment doing duty as an entrance-hall, the remainder of the courtyard being surrounded by low sheds opening into it. These buildings, which look like the "rooms" of a *serai*, are the workshops. The method of coining in this very primitive "Mint" is described as follows: "The silver after being assayed is cast into small bars by being run into grooved iron moulds. The melting is done in the courtyard in very small quantities in little furnaces improvised for each occasion. The thickness of the bars is about the diameter of the rupee, and when cold they are cut up by a hammer and chisel by guess work, into small weights and weighed in small balances as accurately as hand weighing will permit. These are afterwards heated and rounded by hammering into discs, and again weighed by hand and corrected by small additions of silver hammered in cold or by scraping. After this the disc is handed over to the professional weigher, who finally weighs it by hand and passes it. It is then stamped by hammering, being put between two iron dies placed in a strong wooden frame. These dies are very much larger than the coins, so that only a portion of the legend can come off, and the coiners are not at all careful as to how much appears on the coin. The only thing they do is to try and make the particular mark of the reigning chief appear. If they do not succeed it does not matter much."

LONDON WATER SUPPLY.—The Vestry of St. James', Westminster, have invited the other vestries and district boards of the metropolis to appoint delegates to a conference shortly to be held for the purpose of considering the whole subject of metropolitan water supply, and especially the desirableness of asking the Government to introduce a Bill (1) either to confer on the County Council power to acquire the present undertakings or to establish a competing supply; and (2) to require the water companies to supply water by meter at a fixed tariff.

CONVENTION OF GERMAN SODA FACTORIES.—The central office of the ring is in Bernburg, and the object of the convention is the regulation of the output and sale of ammonia soda and soda crystals throughout Germany. The new firm, which comprises eight works—viz., the German Solvay Works, Bernburg; Chemical Works, Buckau; R. Sourmond & Co., Montwy; the Nuremberg Soda Works; Engelcke & Krause, Trotha; Rothenfelder Company, Rothenfelde; G. Eggestorff's Salt Works, Linden; and the Chemical Factory, Schöningen—will be known as the "Syndicate of German Soda-works," and is under the management of Dr. Karl Wessel, in Bernburg. The Leblanc Works are outside the combination.

Market Reports.

TAR AND AMMONIA PRODUCTS.

The holidays have not interfered much with the course of business, as little Benzol has been changing hands, and, in the meantime, prices remain as quoted in our last week's report; 90s. benzol being value for 3/9, and 50/90s. for 2/9. Crude carbolic acid is still under a cloud, though there is no doubt that large quantities are still finding a ready outlet. Pitch remains weak, chiefly on account of the season being over and the hot weather that has arrived. Anthracene may be quoted at 1s. per unit for good quality B.

The sulphate of ammonia market remains practically unchanged, and, though quiet, it cannot be called, by any means, flat. At Hull £12. 5s. is to-day's value, and the same may be quoted for Leith. In London, things remain *in statu quo*, though prices of Beckton are a trifle lower than at this time last week.

MISCELLANEOUS CHEMICAL MARKET.

Business during the week has been interfered with by the Whitsuntide holidays, which are very generally observed in the large manufacturing centres. In the alkali trade transactions have been small owing to this cause, and prices are nominally as they stood at the end of the past week—viz., for 70%, £8. 5s. to £8. 10s.; 60%, £7. 5s.; and cream 60%, £7. 2s. 6d. f.o.b. Liverpool. For 74% and 77% prices are £9. and £9. 15s. per ton respectively, f.o.b. Liverpool and Tyne. Soda ash varies between 1 3/4 and 1 1/2 per deg. for carbonated 48% to 58%; but makers are fairly well engaged with orders for some little time forward, and buyers do not find it easy to obtain early supplies at low prices. Soda crystals are fairly strong, and prices unaltered. Chlorate of potash and soda 4 3/4 d. and 6d. per lb. respectively. Vitriol and muriatic acids are quiet. Bleaching powder steady at £5. per ton rails; £5. 7s. 6d. f.o.b. Sulphur without change. Sulphate of copper steady at £25. to £25. 10s. for early delivery. Sal ammoniac and muriate of ammonia are moving off more readily. Other ammonia salts still quiet, and prices unaltered. Acetate of lime: Brown without change, and only a small amount of business being done. Acetic acids of all kinds dull. Potash: Caustic and carbonate are moving readily, and prices are well maintained. Oxalic acid has again settled down, and is quiet at 3 3/4 d. per lb. Prussiate of potash moving slowly at 9 1/2 d. per lb. Sulphocyanides firm in price, but little or no business doing. Tartaric and citric acids steady at 1s. 2 3/4 d. and 1s. 4d. per lb. Chromic acid quiet at 6 1/2 d. per lb. Bichromates without change.

REPORT ON MANURE MATERIAL.

During the past week, the holidays have interfered with business, and there is very little to report.

Quotations for mineral phosphates remain without alteration, but there is a greater disposition on the part of manure makers to be covering part of their requirements ahead, and we shall expect before long to hear of a considerable business doing. It is still uncertain how far the

Florida phosphate may affect prices generally, but trial shipments made seem to be satisfactory, and this new source of supply cannot think, fail to influence the market in buyers' favour, though it take some considerable time for it to have its full effect.

There are buyers of cargoes of River Plate bones, spring shipments at £5. 5s. per ton, delivered U.K. ports, but sellers want 2s. more. There are buyers of crushed Kurrachee bones, May shipments, at £4. 17s. 6d. ex quay, Liverpool, but shippers have advanced their price to £5. 2s. 6d., which figure of course entitles them to preclude further business at present. East Indian bone meal continues to sell at £5. 10s. ex quay and store, and we understand that £5 has been bid and refused for a large line, Summer-Autumn shipments. Shippers seem afraid to commit themselves to very extensive sales, knowing what opposition they may have to contend with in buying the other side to cover their sales here. There is a demand for pairs of uncrushed bones, and £4. 12s. 6d. would readily be paid for good clean bones—perhaps £4. 15s. for anything specially good.

Nitrate of soda remains very quiet at 8s. per cwt. on spot. cargoes are worth barely 8s. May-June sailing may be quoted at 8s. 3 3/4 d., and September-October-November about 8s. 7 1/4 d. per cwt.

We have no alteration to note in dried blood or ammonite.

There is a quiet market for kainit at 40s.

There is a less demand for superphosphates, and slightly ex prices would be accepted—say 45s. in bulk, nett cash, delivered on rails at seller's station.

THE TYNE CHEMICAL REPORT.

MONDAY

Owing to it being Bank Holiday to-day, there has been no business done on 'Change. Chemicals since last report have continued steady, with no material alteration in prices. Soda ash, crystals, caustic are in good demand, and last week's rates are fully maintained. Bleaching powder is rather neglected at the moment, but quotations remain unchanged. Sulphate of soda quiet and little done. The following may be taken as the prices current:—Bleaching powder, in softwood casks, £5. to £5. 2s. 6d. per ton; caustic soda, 77%, in drums, £9. 5s. per ton, ground, in 3-4 barrels, £12.; soda ash, 48/52%, 1 1/4 d. nett to 1 3/4 d. less 2 1/2%; crystals, in 1 cwt. bags, net weight, £2. 15s. per ton, in 2 cwt. bags, net weight, £2. 12s. 6d. per ton; in casks, gross weight, £2. 12s. per ton; sulphate of soda, in bulk, 32s. per ton; ground and packed casks, 42s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4 3/4 d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda in 1 cwt. kegs, £5. 15s. per ton, in 5-7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4. 10s. per ton; blanc 1 £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of barium crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

Small coals for manufacturing purposes are in good demand, prices rule very steady. Durham small, quoted, 9s. 6d. to 10s. per ton. Northumberland steam small from 8s. to 8s. 6d. per ton.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday

Since last report, sulphate of ammonia has failed to recover from the depression then becoming discernable, but on the contrary has weakened persistently, until to-day the highest value procurable spot delivery, is £11. 2s. 6d. only; some buyers holding off for lower terms. Makers, however, have elected to play the waiting game, stocks not being out of the way for bulk, and have drawn the line at the figure named. Some makers profess themselves decided not to take that, and with buying and selling opinions so much at variance there is scarcely any business doing. The aspect of the forward section is unchanged, and there seems hardly anything carried through. In the general market the chief feature is a recovery in caustics, principally noticeable in the 70-72 strength. Bleaching powder has another slight declension, and the late idleness in both classes of Scotch bichromate manufacture is, if anything, accentuated. Potash is unchanged, a healthy feeling prevailing all through, except in the case of oil, which now looks forward to the fall of the year for the chance of amendment. Most of the Scotch Mineral Oil Companies have declared working results for the past year, and, with the exception of the Burntisland Oil Company, which confesses a loss, these are considerably better than had been generally anticipated. Chief prices current are:—Soda crystals, 52s. 6d. net Tyne; alum in lump £5.,

% Glasgow; borax, English refined, £29. 10s., and boracic acid, 10s. net Glasgow; soda ash, 1¼d. less 3¼%, Tyne; caustic soda, 76°, £10. 70/72°, £8. 2s. 6d., 60/62° £7. 5s., and cream, 60/62°, all less 2½% Liverpool; bicarbonate of soda, 5 cwt. cs., £6. 5s., and 1 cwt. casks, £6. 10s. net Tyne; refined salt, 48/52°, 1½d. less 1¼%, Tyne; saltcake, 25s. to 26s.; washing powder, £5. 2s. 6d. to £5. 5s. less 5% f.o.r. Glasgow; bichrome of potash, 4d., and of soda 3d., less 5 and 6% to Scotch English buyers respectively; chlorate of potash, 4½d., less 5% any; nitrate of soda 8s. to 8s. 1½d.; sulphate of ammonia, spot, 2s. 6d. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. £35., less 2½% any port; sulphate of copper, £25. less 5% Liverpool; paraffin scale, hard and soft, 2¼d. per lb.; paraffin wax, 120°, i-refined, 3¼d.; paraffin spirit (naphtha), 7d. a gallon; paraffin (burning), 6¾d. to 7d. on rails Glasgow to all Scotch buyers; English orders negotiable about 1¼d. a gallon (lower); ditto (ricating), 86½°, £5. 10s. to £6. per ton; 88½°, £6. 10s.; and 1895°, £7. 15s. to £8. Week's imports of sugar at Greenock 16,906 bags.

THE LIVERPOOL COLOUR MARKET.

COLOURS are quieter. Ochres: Oxfordshire quoted at £10., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; onshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23., etian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra a: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto jewellers', 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, 1e quality, £10. to £15. Paris white, 60s. Emerald green, 10d. lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

Our market has continued to rule fairly steady during the past week. Magnesite: Arrivals practically nil; prices firm, without alteration. Gnesite: No arrivals except a cargo at an outport, which has been very low, and sales, especially for forward delivery, are in the hands of buyers. Raw ground £6. 10s., and calcined ground £10. to 11s. Bauxite (Irish Hill brand): The production is scarcely able to pace with the demand; prices, therefore, are very steady. Lump, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per at the mine. French Chalk: Arrivals comparatively small; prices —i.e., 95s. to 100s. medium, 105s. to 110s. superfine. Barytes (carbonate), easy; selected crystal lump easier at £6.; No. 1 lumps, 90s.; 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground £6.; selected crystal ground, £8. Sulphate: Improvement continues, prices; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. common, 18s. 6d. to 20s.; ground, best white, G.G.B. brand, 65s.; mon, 45s.; grey, 32s. 6d. to 40s. Pumicestone quiet; ground at £10., specially selected lump, finest quality, £13. Iron ores somewhat easier. No. 1 and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Aberlath easier, 14s. to 18s. Purple ore quiet. Spanish magniferous ore continues in fair demand. Emery-stone: Best lumps are still scarce on spot; prices firm. No. 1 lump quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. ers' earth steady; 45s. to 50s. for best blue and yellow; impalpable ground, £7. Scheelite, wolfram, tungstate of soda, tungsten metal in fair request. Chrome metal, 5s. 6d. per lb. gsten alloys 2s. per lb. Chrome ore: Steadier, prices unaltered. Iron ore and metal have further advanced. Uranium oxide, 24s. 6s. Asbestos continues scarce, bringing increased prices. Potter's ore continues firm; smalls, £14. to £15.; selected lump, £16. to 18s. Calamine: Best qualities scarce—60s. to 80s. Strontia steady; hate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. 16.; powdered (manufactured), £11. to £12. Limespar: English unmanufactured, old G.G.B. brand in demand, and brings full prices; for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish, best Ceylon lump at last quotations; Italian and Bohemian, £4. 12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," French sand, in cargoes, continues scarce on spot—20s. 2s. 6d. Ferro-manganese and silicon spiegel easier. Chrome iron, 2s. cent., £24. to £25. Ground mica, £50. China clay freely ing—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. 5s. (at Runcorn).

New Companies.

BIRMINGHAM OXYGEN COMPANY, LIMITED.—This company was registered on the 15th inst., with a capital of £50,000, in £5. shares, to carry on business as manufacturers of oxygen, and also of aerated waters, and for such purposes to adopt an unregistered agreement made respectively with Robert Dempster and John Dempster, James E. Longsen and R. A. Sacré. The subscribers are:—

	Shares.
R. A. Sacré, Knowle, Birmingham	200
W. J. Sacré, Higher Broughton, solicitor	5
J. E. Langdon, Royal Exchange, Manchester, merchant	1
G. W. Hulme, Rochdale, cotton spinner	1
T. Bardsley, Didsbury, yarn salesman	1
A. Melvin, Higher Broughton, clerk	1
G. Baron, Davenport, Cheshire, cashier	1

IRRIGATION SYNDICATE, LIMITED.—This company was registered on the 15th inst., with a capital of £10,000, in £100. shares, to acquire concessions for the establishment of irrigation, drainage, and water-works, from any State, Government, municipal, or other officers. The subscribers are:—

	Shares.
M. Epstein, 93, Albert-street, Regent's-park	1
D. Singer, 52, Leinster-square, Bayswater	1
G. Bergel, 17, Pembroke-crescent, W.	1
C. E. Lester, 180, East India-road, clerk	1
S. C. L. Brown, 3, Church-lane, Hornsey, stockbroker	1
H. Ansbacher, 7, Upper Bedford-place, stockbroker	1
C. P. Kirkham, 18, Willes-road, Kentish Town	1

MEXICAN PORTLAND CEMENT COMPANY, LIMITED.—This company was registered on the 15th inst., with a capital of £20,000, in £1. shares, 100 being founders' shares, to acquire upon terms of an agreement of the 14th, certain patent rights of J. C. Gibbon and H. W. Gibbon, of Mexico, relating to the manufacture of Portland cement and artificial stone in Mexico. The purchase consideration is 100 founders' shares and 4,000 ordinary shares, all credited as fully paid up. The subscribers are:—

	Shares.
H. K. Gow, 36 and 37, Leadenhall-street, solicitor	1
C. Baker, 6, St. Andrew's-villas, Gravesend, cement expert	1
C. W. Woods Curtis, 15, Ramberg-road, Upper Tooting engineer	1
A. E. Carey, C.E., 9, Dean's-yard, Westminster	1
E. C. Friend, Hayes-common, Kent, paint manufacturer	1
W. H. P. Stevens, Buscot, Barnet, secretary to a company	1
A. C. Hartley, 21, Medina-villas, West Brighton	1

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Filtering Machinery. E. Martin. 7,361. May 12.
Electric Switches. G. S. Hooker. 7,373. May 12.
Do. A. Brüll. 7,378. May 12.
Electric Battery.—(Complete Specification). J. N. Levsen. 7,383. May 12.
Injectors.—(Complete Specification). W. P. Thompson. 7,388. May 12.
Decoratation of Fibrous Vegetable Stems.—(Complete Specification). J. Longmore and W. L. Watson. 7,389. May 12.
Decoratation of Fibrous Vegetable Stems.—(Complete Specification). J. Longmore and W. L. Watson. 7,390. May 12.
Injectors.—(Complete Specification). W. P. Thompson. 7,391. May 12.
Electric Heating. R. Kennedy. 7,399. May 13.
Steam Gauges. E. Outram. 7,412. May 13.
Refuse Destructors. W. Walkington. 7,419. May 13.
Production of Hydroxy-Quinone. R. Holliday. 7,421. May 13.
Vacuum Pumps.—(Complete Specification). H. H. Lake. 7,426. May 13.
Brick-making Machinery.—(Complete Specification). R. Knickerbocker. 7,427. May 13.
Electric Switches. B. Dukes. 7,436. May 13.
Annealing of Metals.—(Complete Specification). H. H. Lake. 7,461. May 13.
Amalgamating Machinery. W. J. Smuts. 7,464. May 13.
Refuse Destructors.—(Complete Specification). L. Hesse. 7,500. May 14.
Unhairing Skins. F. R. Maggs. 7,509. May 14.
Improved Brush for Dynamos. M. Immisch. 7,511. May 14.
Means for Preventing Polarization in Primary Batteries. A. Walker and T. J. D. Rawlins. 7,518. May 14.
Liquid Metres. R. M. L. G. Renaud. 7,519. May 14.
Improvements in Connection with Indigo Dyeing. W. Elbers. 7,522. May 14.
Improvements in Connection with the Ammonia Soda Process. J. Vivian and G. Bell. 7,527. May 14.
Liquid-measuring Apparatus. J. Leloup. 7,537. May 14.
Filters. J. P. Bayly. 7,546. May 14.
Ammeters and Voltmeters. C. R. G. Smythe and E. Payne. 7,560. May 15.
Preparing Animal Fibres for Spinning. K. T. Sutherland and G. Esdale. 7,568. May 15.
Producing Air Gas. T. Le Poidevin. 7,569. May 15.
The Production of New Amido Bases. A. G. Green and T. A. Lawson. 7,575. May 15.
Electro Disposition of Heavy Metals. W. A. Thoms. 7,881. May 15.
Registering Apparatus for Paper-making Machines. C. J. Richardson. 7,598. May 15.
Improvements in Gas Holder Guides. E. L. Pease. 7,616. May 16.
Smoke Consumption. W. D. Grimshaw. 7,625. May 16.
Re-tinning Copper Utensils. C. Knight and W. F. Sharp. 7,647. May 16.
Pressure Pumps. C. Kingsford. 7,667. May 16.
Electric Meters. C. D. Abel. 7,670. May 16.
Treatment of Sewage. E. L. Mayer. 7,673. May 16.
Manufacture of Soap. J. A. Clough. 7,706. May 17.
Measuring Oxygen or Air into Gas Purifier. C. B. Newton. 7,714. May 17.
Treating Chemically Softened Waters for Boiler Use. L. Archbutt and R. M. Deeley. 7,719. May 17.
Preventing the Access of Air to Iron and Steel during Annealing.—(Complete Specification). H. H. Lake. 7,733. May 17.
Manufacture of Water Gas. J. Von Langer and L. Cooper. 7,739. May 17.

Gazette Notices.

Partnerships Dissolved.

B. PIFFARD and W. H. CRANSTONE, under the style of the Patent Silicate Manure Co., Hemel Hempstead, manufacturers of artificial manures.
CLARKE & COOBAN, Blaenau, Festiniog, mineral water manufacturers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

THOMAS WILLIAMS and JOHN HENRY THOMAS (trading as Grindley Chester, chemists and druggists.
LAWRENCE HAYWARD COOK, Prospect Hill, Walthamstow, and Amb Hackney, London, drysalter.

Adjudications.

GEORGE ELLIS MOSES, Manchester, drysalter.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

Period ending May 17th.

Acetic Acid —		
Holland, 73 pks.	A. & M. Zimmermann	
" 1	Barr Moering & Co.	
Ammonia —		
Holland, £28	W. H. Cole & Co.	
Antimony —		
Belgium, 3 t.	Girard Bros. & Co.	
Austria, 42 t.	H. R. Merton & Co.	
Antimony Ore —		
New Zealand, 42 t.	N. Z. Antimony Co.	
France, 73	Smith Sundius & Co.	
Alkali —		
Holland, 200 c.	Taylor Sommerville & Co.	
Bones —		
E. Indies, 200 t.	Gonne Croft & Co.	
Trinidad, 24	Beresford & Co.	
U. S., 25	A. W. Nesbitt	
E. Indies, 208	Gonne Croft & Co.	
Boracic Acid —		
Italy, 50 pks.	J. Bath & Co.	
Brimstone —		
Italy, 20 t.	G. Boor & Co.	
" 5	F. Smith	
Barium Chloride —		
Germany, £80	Petri Bros.	
Barytes —		
Germany, 24 cks.	O'Hara & Hoar	
Carbonic Gas —		
Holland, £15	Phillipps & Graves	
Copper Ore —		
Belgium, 30 t.	A. Gibbs & Sons	
Cossack, 20 t.	W. Marden	
Belgium, 10	F. Manders	
Cobalt Ore —		
France, 210 t.	Newcomb & Son	
Cream of Tartar —		
Holland, 10 pks.	Middleton & Co.	
Italy, 20	W. C. Bacon & Co.	
Caustic Potash —		
France, £120	F. W. Berk & Co.	
Caoutchouc —		
Zanzibar, 64 c.	L. & I. D. Jt. Co.	
U. S., 160	J. E. Wilson	
France, 71 c.	Hernu Peron & Co.	
E. Indies, 7	L. & I. D. Jt. Co.	
" 90	G. Ward & Sons	
" 67	Ross & Deering	
U. S., 22	L. & I. D. Jt. Co.	
Portugal, 400 c.	Kleinwort Sons & Co.	
Copper Sulphate —		
Holland, £220	Middleton & Co.	
Chemicals (otherwise undescribed)		
Germany, £820	A. & M. Zimmermann	
" 16	Phillipps & Graves	
" 60	Beresford & Co.	
" 10	H. J. Pearlbach & Co.	
" 113	A. & M. Zimmermann	
Holland, 16	T. H. Lee	
Dyestuffs —		
Gambler		
Singapore, 131 pks.	Beresford & Co.	
" 858	L. & I. D. Jt. Co.	
" 1,182	R. & J. Henderson	
Saffron		
Spain, 1 pks.	C. Brumlen	
Cutch		
E. Indies, 20 pks.	Mee Billing & Co.	
" 1,500	H. A. Litchfield & Co.	
" 899	L. & I. D. Jt. Co.	
" 200	Brinkermann & Co.	

Indigo		
E. Indies, 10 chts.	G. S. N. Co.	
" 13	Benecke Souchay & Co.	
" 5	L. & I. D. Jt. Co.	
" 26 pks.	Ross & Deering	
" 9 chts.	Elkan & Co.	
" 46	L. & I. D. Jt. Co.	
" 11	J. Owen	
" 8	Thomasset & Co.	
" 62	L. & I. D. Jt. Co.	
" 7	W. Isted	
" 11	Parsons & Keith	
" 2	Benecke Souchay & Co.	
" 10	L. & I. D. Jt. Co.	
" 56	Arbuthnot Latham & Co.	
Extracts		
France, 100 pks.	L. J. Levinstein & Son	
Austria, 817	A. J. Humphrey	
Holland, 155	Union L. Co., Ltd.	
" 221	Prop. Chmbln's. Wt.	
Tanners Bark		
Holland, 37 t.	J. J. Williamson & Co.	
" 50	J. Graves	
Italy, 9 t.	A. & W. Nesbitt	
Holland, 9	S. Bevington & Sons	
" 15	Dalgaty & Co.	
Melbourne, 37 t.	Baxter & Hoare	
Adelaide, 7 t.	Devitt & Hett	
Myrabolams		
E. Indies, 3,391 pks.	Marshall & French	
Holland, 200	"	
Sumac		
Italy, 800 pks.	J. Kitchin, Ltd.	
Argols		
Italy, 1,649 pks.	B. Jacob & Sons	
" 311	Thames S. Tug Co.	
Alizarine		
Durban, 12 pks.	J. Forsey	
Glucose —		
Germany, 25 pks.	221 c. Craven & Co.	
U. S., 100	650 L. Sutro & Co.	
" 20	120 T. H. Lee	
France, 1	7 Carey & Sons	
U. S., 200	1,215 T. M. Duche & Sons	
" 112	600 Harne & Co.	
Gutta-Percha —		
Singapore, 266 c.	Jackson & Zill	
" 164	L. & I. D. Jt. Co.	
" 516	Kleinwort, Sons & Co.	
" 177	Kaltenbach & Schmitz	
Isinglass —		
E. Indies, 14 pks.	Clarke & Smith	
Manure —		
Holland, 175 t.	Lawes Manure Co.	
" 195	Ang-Contl. G. Wks.	
" 195	A. Hunter & Co.	
Germany, 50	Beresford & Co.	
U. S., 11	C. A. & H. Nichols	
" 5	"	
Naphtha —		
Holland, 41 drs.	Burt, Boulton & Haywood	
Potassium Carbonate —		
Germany, 10 pks.	F. J. Putz & Co.	
Paraffin Wax —		
U. S., 296 brls.	64 bgs. H. Hill & Sons	
" 242	"	
Pearl Ashes —		
France, 100 c.	F. W. Berk & Co.	
Holland, 400	"	
Potassium Muriate —		
Holland, 4 cks.	Spies Bros. & Co.	
" 26	H. Johnson & Sons	
Potassium Hydrate —		
France, 4 pks.	Spies Bros. & Co.	
Potassium Sulphate —		
Germany, 112 pks.	Howards & Son	
" 284	Bessler, Waechter & Co.	

Plumbago—

E. Indies, 179 brls.	W. H. Ison
" 91	Arbuthnot, Latham & Co.
Germany, 25 cs.	T. H. Lee
" 63	"
E. Indies, 56 brls.	J. Thredder, Son & Co.
Germany, 60 cs.	T. H. Lee
E. Indies, 80 brls.	Doulton & Co.
" 159	Props. Chamblins. Wf.
Pitch —	
France, 95 brls.	Berlandrina Bros. & Co.
Saccharine —	
Portugal, £370	J. Hall Jun. & Co.
Sugar of Lead —	
Holland, 14 pks.	Beresford & Co.
Saltpetre —	
E. Indies, 593 bgs.	200 cks. Henschell, du Buisson & Co.
Tartaric Acid —	
Holland, 4 pks.	Middleton & Co.
" 37	B. & F. Wf. Co.
France, 8	"
Tartar —	
Italy, £1,400	B. Jacob & Sons
" 1,050	Seager, White & Co.
Ultramarine —	
Holland, 3 pks.	Ohlenschlager Bros.
Germany, 7	H. Brooks & Co.
Holland, 2 cks.	Phillipps & Graves
Germany, 4	J. Kitchin, Ltd.
" 4	G. Steinhoff
Zinc Oxide —	
Germany, 50 brls.	M. Ashby, Ltd.
U. S., 200	"
Holland, 42 cks.	Beresford & Co.
" 65 brls.	M. Ashby, Ltd.
" 250 cks.	Soundy & Son
" 200 brls.	M. Ashby, Ltd.

LIVERPOOL.

Period ending May 20th.

Acetate of Lime —	
New York, 818 bgs.	"
" 1,350	"
Albumen —	
Havre, 15 cs.	Cunard S. S. Co. Ld.
Acids (otherwise undescribed)	
Leghorn, 53 cks.	"
Arsenic —	
Santander, 169 cs.	"
Bones —	
Boston, 5 tcs.	"
Ceara, 118 bgs.	R. Singlehurst & Co.
" 1,429	Leach, Harrison, & Co.
Bone Meal —	
Kurrachee, 1,000 bgs.	Ralli Bros.
Borax —	
Leghorn, 150 cs.	"
Caoutchouc —	
Brazil, 531 cs.	R. Singlehurst & Co.
Ceara, 1	1 bl.
Pernambuco, 19	"
Accra, 7	Davies, Robbins, & Co.
Salt Pond, 1 cs.	Radcliffe & Durrant
" 1 ck.	Edwards Bros.
" 2	A. Millerson & Co.
" 1	W. Griffiths & Co.
" 1 cs.	A. & C. Nordlinger
" 2 ck.	Pitt Bros. & Co.
" 2	8 cs. Pickering & Berthoud
" 1	E. G. Gunnel
Caoutchouc—continued.	
Salt Pond, 8 cks.	Miller E
" 3cs	Davie
Cape Coast, 8	2 Miller, J
" 1	1 Ed
" 3	W.
" 3	H. B.
" 7	Davies,
" 1	1 F. J. E
" 3	W. B.
" 1	S He
" 1	3 Fletche
" 8	1h
Axim, 3 bgs.	1 brl. Pickeri
" 5	1 Edv
" 1	A. Mille
" 4	Radcliffe
" 1	Millward, Brack
Goree, 8 brls.	S John
Bathurst, 4 cks.	Ci
Copper Ore —	
Leghorn, 26 t.	"
Sestri Levante, 1,025 t.	H. B
Cream of Tartar —	
Rotterdam, 10 cks.	"
Chemicals (otherwise un.	
Hamburg, 9 cs.	"
Rouen, 88 cks.	Co-op. W
Dyestuffs —	
Sumac	
Palermo, 400 bgs.	J. Kiti
" 550	"
Valonia	
Alexandria, 150 bgs.	C
Patras, 84c	C G. P.
Fustic	
Savanna, 2,616 logs.	G. H. M
Colon, 11 t.	Melchers, Ru
Ceara, 5½	Leach, Harr
Corfu, 4	P. V. Marri
Argols	
Bordeaux, 76 cks.	95 bgs
Oporto, 23	Ge
Extracts	
Rouen, 406 cks.	Co-op. W'sal
Cutch	
Calcutta, 400 cs.	"
Myrabolams	
Bombay, 2,847 bgs.	D. Sas
" 1,526	"
" 296	Beyts, C
" 1,335	D. Sas
" 986	"
" 505	"
Calcutta, 702 bgs.	"
Bombay, 80	R. C
" 41	Tod, Du
" 2,105	D. Sas
" 338	"
Glucose —	
Hamburg, 24 cks.	200 bgs.
New York, 20 brls.	"
Horn Piths —	
Brazil, 5 t.	Gillies
Ceara, 73 bgs.	R. Single
Manganese Ore —	
Oporto, 110 t.	"
Nitrate —	
Pisagua, 9,371 bgs.	"
Phosphoric Acid —	
Bremenhaven, 3 cs.	D. Cu
Potash Salts —	
Bremenhaven, 14 cks.	D. C

Phosphate —	
Bruges, 600 bgs.	
Potash —	
Montreal, 10 brls. Makin & Bancroft	
" 20 Haines & Co.	
" 15	
Potassium Prussiate —	
Rotterdam, 4 cks.	
Pyrites —	
Huelva, 1,550 t. Matheson & Co.	
" 1,340 Tenants & Co.	
" 1,238	
Paraffin Wax —	
New York, 100 bbls. Meade, King, & Co.	
Sulphur —	
Palermo, 440 bgs.	
Saltpetre —	
Calcutta, 1,199	
Kurrachee, 109 W. & R. Graham & Co.	
Stearine —	
Rotterdam, 3 cks. 20 bgs.	
Salt —	
Madeira, 140 bgs.	
Tartaric Acid —	
Bilbao, 32 brls.	
Tartar —	
Naples, 2 cks.	
Bordeaux, 38	
Rotterdam, 1	
Waste Salt —	
Hamburg, 494 bgs.	
" 640	

GLASGOW.

Week ending May 22nd.

Alum —	
Rotterdam, 45 cks.	
Barytes —	
Antwerp, 100 bgs.	
Chrome Ore —	
Rotterdam, 2,100 bgs.	
Dyestuffs —	
Alizarine	
Rotterdam, 89 cks. J. Rankine & Son	
Madders	
Rotterdam, 1 ck. J. Rankine & Son	
Extracts	
New York, 27 cs.	
Antwerp, 1 ck. 1 cs.	
Fustic	
Jamaica, 9 t. 15 c. Wallace	
" Wilkie & Co.	
Glycerine —	
Rotterdam, 5 cs.	

Glucose —	
New York, 208 brls.	
Manganese Chlorate —	
Rotterdam, 1 ck.	
Pyrites —	
Huelva, 1,195 t. Tharsis Co.	
Stearine —	
Antwerp, 12 bgs.	
Saltpetre —	
Hamburg, 48 cks.	
Sulphur Ore —	
Bergen, 300 t.	
Tartaric Acid —	
Rotterdam, 4 cks. J. Rankine & Son	
Ultramarine —	
Rotterdam, 5 cs. J. Rankine & Son	
Waste Salt —	
Hamburg, 320 t.	
" 271 cks.	

TYNE.

Period ending May 20th.

Barytes —	
Antwerp, 50 bgs. Tyne S. S. Co.	
Glucose —	
Hamburg, 50 bgs. Tyne S. S. Co.	
" 12 cs.	
Rock Salt —	
Hamburg, 150 t.	
Salt —	
Hamburg, 150 t.	
Tartaric Acid —	
Rotterdam, 4 cks. Tyne S. S. Co.	
Zinc Oxide —	
Antwerp, 20 brls. Tyne S. S. Co.	

HULL.

Week ending May 22nd.

Acetic Acid —	
Rotterdam, 10 pks. Hutchinson & Son	
Acids (otherwise undescribed)	
Rotterdam, 1 ck. W. & C. L. Ringrose	
" 4	
Barytes —	
Bremen, 62 cks. H. F. Pudsey	
Antwerp, 38 brls.	
" 18 cks.	
Bremen, 23	
" 23 Tudor & Son	
" 23 T. W. Flint & Son	
" 18 J. W. Davis & Son	
Bones —	
Trieste, 2 pks. Wilson, Sons & Co.	

Chemicals (otherwise undescribed)	
Dunkirk, 79 pks. Wilson, Sons & Co.	
Antwerp, 136	
Hamburg, 245	
Bremen, 1 ck. 21 kgs. Veltmann & Co.	
Genoa, 16 cks. Wilson, Sons & Co.	
Marseilles, 5	
Rotterdam, 1 W. & C. L. Ringrose	
Dunkirk, 22 pks. Wilson, Sons & Co.	

Dyestuffs —	
Cutch, 1 bl. G. Lawson & Sons	
Argols	
Bari, 24 cks. Wilson, Sons & Co.	
Extracts	
Rouen, 38 cks. Rawson & Robinson	
Fiume, 700 bls. Wilson, Sons & Co.	
Dunkirk, 25 cks.	

Sumac	
Bordeaux, 100 bls. Rawson & Robinson	
Trieste, 20 bgs. Wilson, Sons & Co.	
Palermo, 376	
" 350	

Alizarine	
Rotterdam, 78 cks. W. & C. L. Ringrose	
" 20 G. Lawson & Sons	
" 5 W. & C. L. Ringrose	
" 20 pks.	
" 21 cks. Hutchinson & Son	

Rennet	
Copenhagen, 8 cks. Wilson, Sons & Co.	
Rotterdam, 5	

Fustic	
Hamburg, 317 pks. Wilson, Sons & Co.	

Glucose —	
Hamburg, 6 cks. Wilson, Sons & Co.	
" 8 C. M. Lofthouse & Co.	
Stettin, 210 bgs. Wilson, Sons & Co.	
" 11 cks. M. Whitfield & Sons	
" 21 Hull Dock Co.	
" 200 bgs. Thompson, McKay & Co.	

New York, 80 cks.	
Hamburg, 12 Bailey & Leatham	
" 200 bgs.	
" 12 cks. Bailey & Leatham	
" 17	

Kainit —	
Hamburg, 500 bgs. G. Lawson & Sons	

Manure —	
Ghent, 160 t.	
Rouen, 4 cks. Rawson & Robinson	

Naphthaline —	
Hamburg, 1 brl. Wilson, Sons & Co.	

Oxide —	
Rotterdam, 4 cks. Hutchinson & Son	

Pyrites —	
Huelva, 1,512 t. J. Dalton, Holmes & Co.	

Pitch —	
Dunkirk, 35 cks. Wilson, Sons & Co.	
Plumbago —	
Hamburg, 42 cks.	
" 21 bls. Wilson, Sons & Co.	
Sulphur —	
Catania, 368 pks. Wilson, Sons & Co.	
Turpentine —	
Liban, 50 bls.	
Tar —	
Marseilles, 25 cks.	

GRIMSBY.

Week ending May 17th.

Glucose —	
Hamburg, 14 cks.	
Kainit —	
Hamburg, 500 bgs.	

GOOLE.

Week ending May 14th.

Alum —	
Rotterdam, 21 cks.	
Barytes —	
Antwerp, 50 bgs.	
Chrome Alum —	
Rotterdam, 30 cks.	

Dyestuffs —	
Alizarine	
Rotterdam, 61 pks.	
Madders	
Rotterdam, 5 cks.	
Logwood	
Jamaica, 550 t.	

Dyestuffs (otherwise undescribed)	
Antwerp, 5 cs. 97 cks.	

Glucose —	
Hamburg, 48 cks. 200 bgs.	
Calais, 100	

Manure —	
Phosphate Rock	
Ghent, 800 bgs.	

Potash —	
Hamburg, 100 bgs.	
Calais, 117 drs.	
Dunkirk, 58 cks.	

Saltpetre —	
Hamburg, 20 cks.	

Sodium Silicate —	
Rotterdam, 1 ck.	

Waste Salt —	
Hamburg, 537 t. 1,015 bgs. 662	

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Period ending May 14th.

Ammonium Sulphate —	
Rotterdam, 85 t. £1,020	
Emmerich, 125 1,500	
Arsenic —	
Sydney, 1 t. £15	
Ammonium Carbonate —	
Sydney, 15 cs. £27	
Benzic Acid —	
New York, 8 cs. £67	
Boracic Acid —	
Melbourne, 18 c. £36	
Copper Sulphate —	
Sydney, 2 t. £49	
Genoa, 5 125	
Citric Acid —	
Libau, 1 c. £8	
Bombay, 2 14	
Yokohama, 5 cks. 38	
Progreso, 1 cs. 20	
Toronto, 6 43	
St. Petersburg, 1 t. 149	
Hamburg, 2 kgs. 43	
B. Ayres, 5 brls. 105	
Clarifiants —	
Bordeaux, 45 cks. £90	

Carbolic Solid —	
Barcelona, 10 c. £70	
Yokohama, 1,000 lbs. 57	
Carbolic Acid —	
Algoa Bay, 3 cs. £39	
Calomel —	
New York, 20 cs. £164	
Copperas —	
Melbourne, 5 t. 13 c. £13	
Disinfectants —	
Sydney, 43 cs. £91	
Penang, 200 gls. £30	
Guano —	
Barbadoes, 30 t. £300	
" 320 3,200	
Manure —	
Berice, 20 t. £205	
Rotterdam, 60 510	
Antigua, 25 4c. 306	
Riga, 50 150	
Nitric Acid —	
Jersey, 2 t. 7 c. £43	
Potash —	
Melbourne, 5 c. £22	
Gothenburg, 10 22	
Potassium Cyanide —	
B. Ayres, 2 cs. £20	

Phosphoric Acid —	
Demerara, 5 t. 10 c. £86	
Potassium Chlorate —	
Sydney, 5 t. £211	
New York, 10 c. 28	
Sheep Dip —	
Algoa Bay, 1 t. 5 c. £66	
Pt. Elizabeth, 6 15 300	
Salammoniac —	
Aden, 1 t. 1 c. £37	
Sydney, 13 24	
Salicylic Acid —	
Singapore, 2 c. £17	
Zinc Ashes —	
Antwerp, 21 t. 16 c. £400	

LIVERPOOL.

Period ending May 17th.

Bleaching Powder —	
Barcelona, 70 cks.	
Boston, 421 34 tcs. 25 cs.	
Calcutta, 25	
Genoa, 67	
Halifax, 2	
Hamburg, 27 20 kgs.	
Lisbon, 29	
Montreal, 32 tcs.	
New Fairwater, 57 cks.	

Bleaching Powder—continued.

New York, 452 cks. 168 tcs.	
Rotterdam, 29	
Vera Cruz, 60 brls.	
Antwerp, 27	
Bilbao, 21 brls. 44 kgs.	
Boston, 188 25 tcs.	
Carthagena, 10	
Genoa, 58	
Ghent, 23	
Hamburg, 28	
Havanna, 8	
Leghorn, 10	
Malaga, 5	
Naples, 10 10 10	
New York, 298	
Philadelphia, 48	
Rio Janeiro, 20 cs.	
Rouen, 44	
Caustic Soda —	
Stettin, 6 dms.	
Trieste, 21	
Valparaiso, 70	
Stockholm, 23	
Adelaide, 32	
Algiers, 5	
Amsterdam, 25	
Antwerp, 36 14 cks.	
Batoum, 138	
Bilbao, 20	
Bordeaux, 37	

Caustic Soda—continued.

Calcutta, 10 dms.		
Dunkirk, 6		
Galatz, 100		
Genoa, 116		
Gothenburg, 5		
Hamburg, 498		
La Guayra, 46		
Leghorn, 28		
Lisbon, 18		
Madeira, 5		
Madrid, 10	20 brls.	
Marseilles, 45		
Melbourne, 34		
Messina, 80		
Montreal, 483		
Naples, 20		
New Fairwater, 113 dms.		
New York, 1300		
Odessa, 250		
Oporto, 30	8 cks.	
Rotterdam, 26		
Santos, 7		
Bahia, 10		
Barcelona, 300	80	20 brls.
Bilbao, 126		35
Bruges, 6	4	
Genoa, 182		
Gothenburg, 4		
Hamburg, 460		
Hio, 70		
Leghorn, 85		
Lisbon, 94	11	4
Malaga, 10		
Manila, 50		
Montevideo, 200		
Montreal, 100		
New Fairwater, 29		
New York, 250	80 brls.	
Philadelphia, 135		
Piræus, 85		
Puerto Cabello, 11 dms.		
Rouen, 52		
San Sebastian, 40		
Santos, 11		
Seville, 25		
Stettin, 27		
Valencia, 41		
Yokohama, 30		
Gibraltar, 20		
Rotterdam, 54		
Epsom Salts—		
Batoum, 13 cks.		
Maranham, 8		
Rio Janeiro, 100 kgs.		
Macedo, 1		
Magnesia—		
Antwerp, 1 cs.		
Rio Janeiro, 10		
Vera Cruz, 2 cks.		
Salt—		
New York, 25 t.		
Old Calabar, 154 3/4 t.		
Opobo, 45	9 c.	
Para, 177 1/2		
Philadelphia, 30		
Port Mulgrave, 250 t.		
Rangoon, 25		
Rotterdam, 203		
St. John, N.B., 800		
Sandheads, 2145		
Sydney, 50		
Vadsol, 465		
Winnabah, 10		
Abonema, 43		
Ambriz, 5		
Amsterdam, 261		
Antwerp, 42		
Benin, 22		
Boston, 156		
Calcutta, 1320		
Cameroon, 4	150	
Campbeltown, 1419 3/4		
Halifax, 63 1/2		
Hamilton, 63 1/2		
Loango, 12 1/2		
Miramichi, 180		
Montreal, 301	10 c.	
Baltimore, 100		
Benin, 23		
Bonny, 36		
Boston, 100	2 cks.	
Bruges, 200		
Chicago, 299		
Coquimbo, 50		
Elobey, 5		
Grand Basam, 12 t.		
Hamburg, 50		
Manaos, 52 1/2		
Montreal, 223		
Newcastle, 200		
Old Calabar, 115 1/4		
Rouen, 10		
Shediac, 10		
Sydney, 75		
Victoria, 150		
Vigo, 2		

Sodium Bicarbonate—

Bombay, 10 kgs.		
Calcutta, 500		
Genoa, 15 cks.		
Halifax, 25		
Hamburg, 50		
Havana, 25		
Miramichi, 15		
Montreal, 400	19	
Nagasaki, 200		
Odessa, 100		
Palermo, 20		
Lante, 20		
Amsterdam, 20	2 brls.	
Calcutta, 500		
Hamburg, 20 dms.		
Santander, 40		
Smyrna, 15		

Sodium Silicate—

Barcelona, 32 cks.		
Bilbao, 32	15 brls.	
Galatz, 10		
La Guayra, 10		
Lisbon, 32		
Madrid, 10		
Montreal, 42		
Seville, 25		
Victoria B.C., 32		

Soda Ash—

Oporto, 10 pks.		
Philadelphia, 427 cks.	28 tcs.	
Piræus, 16 tcs.	36 brls.	
Sherbrooke, 5		
Smyrna, 60		
Varna, 100		
Windsor Mills, 222		
Yokohama, 20		
Bahia, 109 cks.		
San Francisco, 79 brls.		
Adelaide, 509		
Baltimore, 397	130 tcs.	
Bilbao, 40	4 brls.	
Boston, 7 cks.		
Constantinople, 4		
Genoa, 120		
Hamburg, 14		
Hamilton, 5		
Kingsey, 42		
Leghorn, 30		
Madeira, 69	17	
Madrid, 306	1055	
Montreal, 134		
New York, 378 tcs.		
Baltimore, 10		
Boston, 50 brls.		
Corfu, 12		
Ghent, 13		
Lisbon, 10		
Monte Video, 10		
Philadelphia, 685		
Puerto Cabello, 150		
Rio Janeiro, 15		
Valparaiso, 15		

Soda Crystals—

Bilbao, 17 brls.	6 cks.	
Boston, 280		
Calcutta, 10		
Malta, 53		
New York, 280		
Singapore, 9		
Victoria B.C., 20		
Monte Video, 67 brls.		
New York, 56		
Portland, 100		
Quebec, 50		
Singapore, 12 cks.		

Tar—

Rouen, 59 t.	14 c.	
Calcutta, 24 brls.		

GLASGOW.

Week ending May 22nd.

Ammonia—		
Hong Kong, 2 t.	18 c.	£70. 10s.
Charcoal—		
Antwerp, 118 c.		£27
Caustic Soda—		
New York, 200 1/4 c.		£56
Copper Sulphate—		
Rouen, 2 t.	16 1/2 c.	£57
Chloride of Lime—		
San Francisco, 306 1/2 c.		£96
Citric Acid—		
Lisbon, 5 c.		37
Dyestuffs—		
Logwood, 8 t.	13 1/2 c.	£69
Epsom Salts—		
Christiana, 50 bgs.		£33
Manganese Oxide—		
New York, 200 1/4 c.		£93

Manure—

Christiana, 2 c.	£1	
Paraffin Wax—		
Barcelona, 10 t.	3 1/2 c.	£280
Oporto, 10	4	250
Bordeaux, 2	16 1/2	79
Fremantle, 1	15	132
Bilbao, 46	3	67
Antwerp, 103		45
Potassium Bichromate—		
Antwerp, 130 3/4 c.		£194
New York, 493		921
Rouen, 16 t.	18 1/2	559
Barcelona, 109		200
Antwerp, 103 1/2		150
Potassium Prussiate—		
Rouen, 116 3/4		£305
Pitch—		
La Rochelle, 628 t.	3 c.	£785
Bilbao, 563	12 1/2	1,005
Soda Ash—		
San Francisco, 310 1/4 c.		£86
Sodium Bichromate—		
New York, 495 c.		694
Rouen, 12 t.	18 1/2 c.	292
Barcelona, 43		60
Superphosphate—		
Christiana, 20 t.		£100

HULL.

Week ending May 20th.

Alkali—		
Harlingen, 94 cks.		
Bone Size—		
Amsterdam, 10 cks.		
Bleaching Powder—		
Drontheim, 30 cks.		
St. Petersburg, 50		
Borax—		
Libau, 7 cks.		
Caustic Soda—		
Libau, 154 drums.		
Riga, 158		
St. Petersburg, 350		
Chemicals (otherwise undescribed)		
Antwerp, 29 cs.	2 cks.	
Abo, 9		
Bombay, 24		
Christiana, 43	20 pks.	
Copenhagen, 6		
Drontheim, 1		
Danzig, 7		
Gothenburg, 35	40	5 334 slbs.
Hamburg, 15		
Harlingen, 4		
Lisbon, 5		
Libau, 14		
Norroping, 1		
New York, 20		
Rotterdam, 41	28	
Riga, 20		100
Rouen, 31		
S. Petersburg, 7	188	
Stettin, 6		
Wasa, 14	1 pkg.	
Dyestuffs (otherwise undescribed)		
Antwerp, 1 ck.		
Boston, 5		
Hamburg, 13		
Rotterdam, 1 cs.	5	
Bombay, 43		
Manure—		
Antwerp, 490 bgs.		
Drontheim, 40		
Rotterdam, 491	111 t.	
Pitch—		
Antwerp, 499 t.		
Dunkirk, 113		
Salt—		
Lisbon, 1 cs.		
Tar—		
Christiana, 6 cks.		
Copenhagen, 13		
Gothenburg, 150		
Hamburg, 14		
Stettin, 1		
Wasa, 40		

GRIMSBY.

Week ending May 17th.

Chemicals (otherwise undescribed)		
Hamburg, 12 pks.		
Rotterdam, 10 cs.		

TYNE.

Period ending May

Ammonia—		
Barcelona, 5 t.	17 c.	
Antimony—		
Barcelona, 2 t.	4 c.	
Alkali—		
Hamburg, 3 t.	10 c.	
Aarhus, 2	18	
Rotterdam, 3	11	
Baryta Hydrate—		
Danzig, 5 t.	7 c.	
Barytes Carbonate—		
Antwerp, 10 t.	16 c.	
Baryta Nitrate—		
Antwerp, 6 c.		
Bleaching Powder—		
Norroping, 1 t.		
Antwerp, 19	1 c.	
Hamburg, 20	18	
Aarhus, 2	16	
Rotterdam, 36	10	
Danzig, 2	18	
Copperas—		
Rotterdam, 2 t.	19 c.	
Caustic Soda—		
Antwerp, 5 t.	3 c.	
Christiana, 7	0	
Iron Oxide—		
Malmo, 6 c.		
Litharge—		
Gothenburg, 9 c.		
Antwerp, 11		
Danzig, 5		
Manure—		
Christiana, 15 t.		
Magnesia—		
Barcelona, 12 t.	3 c.	
Potassium Chlorate—		
Hamburg, 5 c.		
Potassium Bichromate—		
Norroping, 4 t.	18 c.	
Phosphorus—		
Malmo, 6 c.		
Pitch—		
Malmo, 5 t.		
Sulphur—		
Gothenburg, 10 t.		
Sodium Chlorate—		
Rotterdam, 1 t.	12 c.	
Sodium Sulphate—		
Danzig, 1 t.	10 c.	
Soda Ash—		
Christiana, 10 t.	5 c.	
New Fairwater, 19 t.	12	
Soda—		
Antwerp, 5 t.	7 c.	
FredericksHAVN, 6 t.	7	
Huelva, 2 t.	3	
Horsens, 11	8	
Rotterdam, 11	8	
Odense, 10	13	
Superphosphate—		
Christiana, 10 c.		
Tar—		
Malmo, 1 t.	5 c.	
Turpentine—		
Antwerp, 1 c.		

GOOLE.

Week ending May

Benzole—		
Antwerp, 24 cks.		
Rotterdam, 48		
Bleaching Preparation		
Hamburg, 58 cks.		
Copper Precipitate—		
Rotterdam, 242 cks.		
Coal Products—		
Rotterdam, 163 cks.		
Chemicals (otherwise un-)		
Dunkirk, 15 cks.		
Hamburg, 97		
Rotterdam, 25		
Dyestuffs (otherwise un-)		
Ghent, 21 cks.		
Manure—		
Boulogne, 153 bgs.		
Dunkirk, 50		
Rotterdam, 550		
Pitch—		
Antwerp, 531 t.		
Ghent, 106		

PRICES CURRENT.

TUESDAY, MAY 27, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25% and 40%	per cwt.	7/-	&	12/6
Glacial	"	65/-		
Arsenic, S.G., 2000°	"	0	12	9
Chromic 82%	nett per lb.	0	0	6½
Fluoric	"	0	0	3¾
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
" (Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1¾
Oxalic	nett	0	0	3¾
Picric	"	0	1	2
Sulphuric (fuming 50%)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (150°)	"	1	4	6
" (free from arsenic, 140/145°)	"	1	7	6
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	"	0	1	3
Arsenic, white powdered	per ton	13	0	0
Alum (loose lump)	"	4	17	6
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 88° = 28°	per lb.	0	0	3
" = 24°	"	0	0	1¾
" Carbonate	nett	0	0	3½
" Muriate	per ton	23	0	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
" Nitrate	per ton	40	0	0
" Phosphate	per lb.	0	0	10½
" Sulphate (grey), London	per ton	11	6	3
" (grey), Hull	"	11	5	0
Aniline Oil (pure)	per lb.	0	0	10½
Aniline Salt	"	0	0	9¼
Antimony	per ton	75	0	0
" (tartar emetic)	per lb.	0	1	1
" (golden sulphide)	"	0	0	10
Barium Chloride	per ton	8	5	0
" Carbonate (native)	"	3	15	0
" Sulphate (native levigated)	"	45/-	&	75/-
Bleaching Powder, 35%	"	5	0	0
" Liquor, 7%	"	2	10	0
Bisulphide of Carbon	"	13	0	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	2	6
China Clay (at Runcorn) in bulk	"	17/6	&	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20%	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30% A, f.o.b. London	per unit per cwt.	0	1	5
Benzol, 90% nominal	per gallon	0	3	9
" 50/90	"	0	2	9
Carbolic Acid (crystallised 35°)	per lb.	0	0	8
" (crude 60°)	per gallon	0	2	2
Creosote (ordinary)	"	0	0	2½
" (filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30% @ 120° C.	"	0	1	4
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	8	0
Solvent Naphtha, 90% at 160°	per gallon	0	1	9
Coke-oven Oils (crude)	"	0	0	2½
Copper (Chili Bars)	per ton	53	0	0
" Sulphate	"	25	10	0
" Oxide (copper scales)	"	55	0	0
Glycerine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	60	0	0
Iodine	nett, per oz.	0	0	9
Iron Sulphate (copperas)	per ton	1	10	0
" Sulphide (antimony slag)	"	2	0	0
Lead (sheet) for cash	"	14	10	0
" Litharge Flake (ex ship)	"	15	10	0
" Acetate (white)	"	24	0	0
" (brown)	"	18	0	0
" Carbonate (white lead) pure	"	19	0	0
" Nitrate	"	22	5	0

Lime, Acetate (brown)		£	s.	d.
" (grey)	per ton	13	10	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	5	0
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	17	10	0
" Borate (1st and 2nd)	per cwt.	60/-	&	42/6
" Ore, 70%	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	10
" Miscible, 60° O.P.	"	0	4	6
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	26	0	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5¼
" American	"	0	0	5¼
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	19	10	0
" Chlorate	per lb.	0	0	4¼
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85%	per ton	22	10	0
" (Caustic Potash) 75/80%	"	21	10	0
" (Caustic Potash) 70/75%	"	20	15	0
" Nitrate (refined)	per cwt.	1	2	6
" Permanganate	"	4	2	6
" Prussiate Yellow	per lb.	0	0	9¼
" Sulphate, 90%	per ton	9	10	0
" Muriate, 80%	"	7	15	0
Silver (metal)	per oz.	0	3	11¼
" Nitrate	"	0	2	8
Sodium (metal)	per lb.	0	4	0
" Carb. (refined Soda-ash) 48%	per ton	6	5	0
" (Caustic Soda-ash) 48%	"	5	5	0
" (Carb. Soda-ash) 48%	"	5	12	6
" (Carb. Soda-ash) 58%	"	6	15	0
" (Soda Crystals)	"	2	17	6
" Acetate (ex-ship)	"	16	0	0
" Arseniate, 45%	"	11	0	0
" Chlorate	per lb.	0	0	6¼
" Borate (Borax)	nett, per ton	29	0	0
" Bichromate	per lb.	0	0	3
" Hydrate (77% Caustic Soda)	per ton	9	15	0
" (74% Caustic Soda)	"	9	0	0
" (70% Caustic Soda)	"	8	5	0
" (60% Caustic Soda, white)	"	7	5	0
" (60% Caustic Soda, cream)	"	7	2	6
" Bicarbonate	"	6	0	0
" Hyposulphite	"	5	10	0
" Manganate, 25%	"	9	0	0
" Nitrate (95%) ex-ship Liverpool	per cwt.	0	8	1¼
" Nitrite, 98%	per ton	28	0	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7¼
" Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40%	per cwt.	2	0	0
" Sulphate (Salt-cake)	per ton	1	5	0
" (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98%	"	8	0	0
Sulphocyanide Ammonium, 95%	per lb.	0	0	7¼
" Barium, 95%	"	0	0	5¼
" Potassium	"	0	0	8
Sulphur (Flowers)	per ton	7	10	0
" (Roll Brims'one)	"	6	0	0
" Brims'one: Best Quality	"	4	7	6
Superphosphate of Lime (26%)	"	2	12	6
Tallow	"	25	10	0
Tin (English Ingots)	"	98	0	0
" Crystals	per lb.	0	0	6¼
Zinc (Spelter)	per ton	23	0	0
" Chloride (solution, 96° Tw.	"	0	0	0

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning**.

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

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COAL SMOKE.

TO strain at a gnat and swallow the proverbial an operation that has aforesaid been considered worthy of imitation. Once in a way, the performer be considered instructive, if it be only to demonstrate folly of agitating our minds over small but visible the total exclusion of the invisible ones of magnitude.

Nothing can illustrate these remarks so well as the agitation respecting coal smoke. It is, however, to be perceived in the Metropolis that unless some taken to promote legislation against the present burning coal in private houses no improvement can be for.

If this be true with regard to visible smoke, it is what we have preached for so long a time. At delivered in Manchester in 1882, the writer said: "believe that were we to banish all the factories for a round you would have the so-called fogs quite as it ever. If we wish to clear the atmosphere our first is with domestic chimneys. It has hitherto been considered a subject too vast to be dealt with, and our sanitary laws have perhaps been wise in their generation by preventing it alone."

An American expert says: "Factory furnaces, are not to be charged with all the smoke. If they were of the English cities would be practically smokeless: vast amount of coal consumed for domestic purposes: for the only difficulty they have in clearing the atmosphere in London smoke from factory chimneys is not prevented, while from those in Paris volumes of rivalling Cincinnati, are constantly emitted, yet the atmosphere is smoky while that of Paris is clear. In vast quantities of bituminous coal are consumed for domestic purposes, in Paris, none. We must therefore conclude the difference in the atmosphere of the two capitals is a difference in domestic conditions."

It is strange that in the discussion of the smoke and the evils due to sulphurous acid should be so systematically neglected. No doubt the cry for the suppression of smoke is well enough in its way, but it resembles not less than the sulphurous acid does the camel.

The *British Medical Journal* has undertaken the task of forming its readers "that smoke from factories or any kind no longer plagues London." The Augean has been cleansed, we are informed, from the information afforded by the long and costly trials carried out in connection with the Smoke Abatement Exhibition, and the agency of the Police and the Home Office, as well as the energetic action of the smoke inspector, London is practically freed from factory smoke. All this no doubt very well, but what about the sulphurous acid, which is well known to the authorities as to be exempted by mention in the 29th Section of the Alkali, &c., Works Regulation Act of 1881: has there been any attempt to evolution?

No doubt some of our correspondents will be asking the question—what do you propose, to limit the evils arising

evolution of sulphurous acid from the combustion of coal? There are many replies that could be given to such a question, but we are afraid improvement is impossible until we live up to the practice of legislating for the suppression of each individual evil, instead of endeavouring to suppress each class evils, in the abstract.

We were pleased to find the bill introduced into the House Lords, for the purpose of giving power to local authorities require that any new house erected should be fitted with methods by which bituminous coal could be burned without the production of smoke, was thrown out after the second reading, and Lord Wemyss is to be congratulated on the success of his opposition, though we do not agree with the arguments which he and others employed to gain their object. When the argument is used that the forcible suppression of a public nuisance is an invasion of the private rights of the builder and householder, we are not at one with his lordship. There is no doubt that a man may do what he pleases with his own property provided he does not infringe the laws of the realm, and what is more, that he does not injure his neighbour by the result of any act indulged in for his own enjoyment.

Leaving smoke production and the fogs they engender on one side, we still have the question before us: what will be done with the sulphurous acid? In this connection we may mention that we have lately seen a fuel, which on burning evolves no sulphurous acid. It is well known to chemists that coal dust mixed with lime or chalk furnishes a fuel giving practically no volatile sulphur. The fuel brought under our notice was in the form of briquettes, giving a smokeless flame, the sulphur remaining in the ash.

We fancy we hear some of our readers exclaiming, "Surely you are not going to advocate compulsion to burn a black fuel?" Why not? The Legislature has compelled chemical manufacturers to build costly condensers to suppress the escape of acid vapours, which do not form a tithe of that which is forth into the air by ordinary coal consumers; then why should not all folk (to use the words of the Alkali Act) "use the most practicable means for preventing the discharge into the atmosphere of all noxious gases?"

If the sulphurous acid of coal smoke could be suppressed, vegetation would flourish once more in our towns, open spaces would be cheering to the eye, instead of the desolate grassless squares which they are now in many places; even residences would be more attractive and more eagerly sought after, rents would not suffer depreciation in the suburbs, and buildings would suffer less from premature decay than they unfortunately do at the present time.

The man who solves this question will deserve the best thanks of his countrymen, who no doubt will reward him as they have done all other public benefactors, viz., starvation and a solatium and a molten image to perpetuate his memory.

WATER GAS.*

THE Board, since its last Report, has continued its investigations on the subject of water gas. It is understood that the parties interested do not desire to offer further evidence in the cases pending at the close of the year. The Board believes that some modification of present law is desirable, and that a report of the work of the Commissioners, in this branch of their duties, ought to be made to the Legislature at the present time.

In the course of its inquiries the Board has endeavoured to ascertain what commercial advantages, if any, might accrue to the companies from an extension of the present statutory limit of carbonic acid, believing that in any such advantages the consumers would

ultimately share, and that the companies ought to be permitted to avail themselves of them, if they could do so without prejudice to the public interest. For this purpose information has been obtained by personal inspection and correspondence from more than a hundred companies. The Board desires to gratefully recognise the uniform courtesy which has been freely extended it by the engineers in charge of water-gas works in other States, and to acknowledge its obligations for the information so freely furnished.

It is clear that the cost of gas, whether coal or water, is not an inflexible figure, the same for all times and places. An advance of fifty cents per ton in coal, or of one cent per gallon in oil, making an increase of ten per cent. in the cost of coal and water gas respectively. In certain large works, where both kinds of gas have been made, the advantage in cost of production has been sometimes with one, sometimes with the other, kind of gas. There are more exclusively water-gas works in the anthracite coal region in Pennsylvania, and within easy reach of it, than in any other portion of the country of the same area: because there the price of anthracite coal has been low, and that of gas coal relatively very high. The particular location of a gas works, and its arrangement, the quality of the materials, and kind of apparatus used, and the kind of labour and superintendence available, may make even larger variations in the cost of either gas.

The expenses of distribution, management, taxes, &c., are not likely to vary greatly, whether coal or water gas is the product; so that the fact of value in estimating the cost of the two gases is the cost to manufacture or cost in the holder, as distinguished from cost at the meter.

The principal items of cost in the holder are for materials, coal and oil, labour and repairs. From the cost of materials in coal gas is to be deducted the very considerable receipts from the sale of coke, tar, ammoniacal liquor. Under the best conditions in this State these receipts have reached 50 per cent. of the cost of coal, and in some companies more favourably situated they have reached a much higher percentage.

A ton of good gas coal will yield approximately ten to eleven thousand feet of gas. In order to secure the candle-power usually supplied in this State there must be added about ten per cent. of cannel, or something more than five gallons of oil, equivalent to more than one-half gallon per thousand feet.

In the production of illuminating water gas there is commonly used more than fifty pounds of hard anthracite coal, and from five to six and one-half gallons of oil for every thousand feet of gas, although in the very best works, and under very favourable conditions, these quantities may be slightly reduced. These two items nearly make up the cost of water gas in the holder.

In coal gas the cost of labour is a most important element. It often nearly equals one-half the gross cost of materials, and in many companies does not vary much from the net cost of coal. In water gas the cost of labour is small.

It has been very difficult for the Board to obtain definite and reliable information as to the cost of repairs in water-gas works. It is not a very considerable item in coal gas, and is probably about one-half as much in water gas.

The following figures show the range of cost in certain companies, each item being calculated independently of the other, and, it is believed, fairly indicate the difference of cost in the holder of the two gases—

MATERIALS.

Coal Gas.

Gas coal.....	40 to 43 cents.
Oil or cannel.....	3 to 7 "
Residuals	13 to 23 "
Nett, for materials	20 to 30 "
Labour	14 to 20 "
Repairs	5 to 8 "
Total	50 to 57 "

Water Gas.

Coal	11 to 15 cents.
Crude oil	13 to 18 "
Naphtha	24 to 33 "
Materials	26 to 33 " *
	38 to 45 " †
Labour	5 to 11 "
Repairs	2 to 3 "
Total	46 to 55 "

The figures relating to coal gas are taken from the returns of certain companies in this State, as made to the Board. The figures relating to water gas are estimates based upon information procured without the State, and intended to show what the same companies might do at current rates for materials, if they were making this instead of coal gas. It may be noted that the companies now making

* Crude oil.

† Naphtha.

water gas in this State have not yet been able to equal the figures given. The relations shown above may be greatly changed at any time. The figures given for naphtha and crude oil are suggestive. A few years ago, when the number of water-gas works was small, the price of naphtha was about the same as that of crude oil to-day. As the demand for naphtha for gas-making purposes increased, the price advanced to a point which nearly neutralised the advantages of its use. Recently a crude oil, from the Ohio fields, difficult to refine, has come across the market at a low price, and an apparatus specially adapted for it has again reduced the cost of water gas to the low point reached when naphtha was first introduced. There are now signs of an advance in its price.

There have been great improvements in water-gas apparatus, and there is much activity in this direction now. It is now claimed that cheap bituminous coal and slack can be made to do the work of expensive anthracite; and, if the expectations of the inventors of this new process are realised, the cost of producing water-gas may be greatly lessened.

In companies whose output is below a certain limit, the peculiar conditions under which they make gas cause the cost to vary greatly from the figures given above. In these the cost per thousand feet for both coal and labour rises rapidly where coal gas is made. There is little or nothing obtainable from residuals, as all or nearly all the coke is used to carbonise the coal, and the production of gas per man is much reduced, since, of necessity, the gas maker must be idle much of the time. In a properly-constructed water-gas works of very small output, while the cost of coal may be easily doubled by the necessity for frequently cooling and reheating the apparatus, the cost of labour is not materially different from the same item in large works. In a single day one man may make and store water gas sufficient for several days' consumption, during which the works need no attention, and the gas maker can devote himself to the numerous other details of the business. Instances have been observed by the Board, in other States, where small works have been carried on in this manner with apparently good results. For reasons not easy to enumerate, the attempts by small companies in this State to pursue a similar course have not heretofore been entirely successful.

Although in the larger works, except in favoured localities, the commercial advantages of manufacturing exclusively coal or water gas may not be considerable, with the methods and apparatus now most in use, the advantage to company and consumer in the combination of the two gases is now generally recognised by the larger companies, and nearly one-third of all the companies in the country manufacture some water gas. The development of electric light, combined with other causes, has greatly increased the public demand for light; a gas of fifteen or sixteen candles is no longer acceptable, and from eighteen to twenty candle gas is as low as companies in the larger towns and cities think it wise to distribute. Gas of this quality cannot be produced with ordinary coal alone, but requires the addition of cannel coal or of oil, which latter, from its low cost and the facilities for handling, has been most generally adopted. For this use of oil the ordinary appliances of a coal-gas works are but poorly adapted. When oil is used in them, it has shown a decided tendency to pass with the coal gas as a vapour, much of which is subsequently deposited in the mains or fixtures in a liquid form, or, by causing a hard substance to form at the tip, obstructs the flow of gas, and causes the forked and irregular flame so common where such gas is used; and the gas often manifests an uncontrollable tendency to smoke. To a high candle-power secured in this way is often due the blackened spots in the ceilings of dwelling-houses where such gas is used.

A water-gas apparatus affords the means for avoiding these difficulties. In this the heats best adapted to breaking up the oily particles into a fixed gas may readily be attained, and gas of a very high candle-power be made. When coal gas is made at the same works, and the two are mixed in the proper proportions and best manner, the unfortunate results mentioned as due to oil should not occur. The gas is composed of the same constituents, but in different proportions, and reaches the burner with that combination of heating and illuminating elements calculated to produce a clear, white flame, free from smoke.

Numerous other reasons suggested by local conditions have induced companies to add to coal-gas works apparatus for making water gas. It enables a company to easily meet a sudden demand for an unusual amount of gas. It can be made ready for gas-making at an hour's notice, then allowed to cool when the demand is over, and this course repeated indefinitely without injury, while coal-gas benches once treated in this manner, would probably need rebuilding. An unexpected dark day may thus be readily provided for; and the considerable changes in consumption, where street lights are burned by moon schedule, but are unexpectedly called for on stormy nights. In some places the increased consumption has made necessary some increase in the capacity of the works, which has been secured with less expense for extension by the introduction of water-gas apparatus, with a conse-

quent saving in capital account. A brief period of extraordinary consumption in midwinter is sometimes provided for in this way many works where both kinds of gas are made, coke produced works is substituted for anthracite coal, furnishing a profitable surplus coke, and preventing a reduction of its price.

These are some of the indirect advantages resulting from a mixture of both kinds of gas in the same works. They are independent of whether one gas made alone costs a little more than the other. To secure them requires the distribution of a gas containing somewhat more than 10 per cent. of carbonic oxide.

The question of the comparative safety of water and coal gas very perplexing and difficult one to solve satisfactorily. One of the members of the Board have personally examined the premises where a large number of deaths have occurred from asphyxiation by illuminating gas in Brooklyn, New York City, Baltimore, and cities. A few of these deaths were caused by coal gas, probably, by a mixed gas; but the larger number were due to gas. Some valuable suggestions have been obtained from inquiries, although great difficulty was experienced in securing definite information. It was impossible, for instance, in most cases to ascertain the length of time the gas was discharged into the room and in many cases the size of the burner, and whether partly wholly open, were only matters of conjecture. Most of the accidents investigated occurred at the cheaper boarding and lodging houses was found in one city—and the same facts also applied to the other in a less degree—that a very low price for gas, great activity on the part of competing companies in canvassing for customers, and very favourable terms that were made for piping buildings and installing fixtures, had led to the introduction of gas into the cheapest lodging and boarding houses, that are frequented by dissolute and ignorant classes. In several instances it was found that the inhaling of gas alone would not have produced death, but caused it by aggravating diseases existing at the time of the accident. Some of the rooms contained less than 500 cubic feet of space, the average of all the rooms was about 1,100 cubic feet. The amount of gas was 75 cubic feet, as nearly as could be ascertained, in a room containing 748 cubic feet of space; but there was a transom at the time of the accident, and the person lived twelve hours after being discovered. The smallest amount of gas was 18 cubic feet, in a room containing 806 cubic feet of space; and the person died when found. The average amount of gas in the rooms was 38 cubic feet. But, as before intimated, the information regarding the amount of gas in the rooms where deaths occurred is unsatisfactory. In three instances where a man and a woman occupied rooms to the men died and the women recovered.

CORNERING.

THIS subject has of late years and recent months received much attention in the 'Change world. It has had the consideration of the most acute lawyers and the sharpest speculators, to say not the attention of those being ruined or on the road to ruin by may aptly be called gambling in stocks and produce. It has suggested in the States that the system of "futures" should be illegal. By this is meant that A shall not sell to B that which yet his or within his power, or perhaps is not yet in existence next crop's cotton. In England there is an almost forgotten Act in existence, passed in the sixteenth century, prohibiting what we in the days of the sixth Edward known as "forestalling." This "stalling" consisted in buying or contracting for any merchandise coming to market, or persuading persons to enhance the price of such goods or food produce was on the market, either of which price would be calculated to make the market dearer. According to the law—were it hauled out of its dusty recess, where it has lain dormant so many generations—a modern "corner" in corn in Liverpool would be illegal, as the word used in 5 and 6 Edward VI., cap. 12, "victual." So would a corner in cotton for the word "merchandise" is used. But we do not suppose that anyone would ever dream of enforcing the letter of the law. Some ingenious means would be devised to escape the provisions of such legislation. There are men to be found as even the great orator of the past, who remarked that the not an Act of Parliament on the statute book through which he not drive a carriage and four. Of course, "cornering" is not a mercifully moral. None will argue that; and there is some satisfaction in knowing that whilst corners ruin the innocent and put a bar way of remunerative labour, they generally bring down a well-earned reward on the heads of their organisers. The French Cour de Cassation has recently made an example of the leaders in the corner, of which we have recently heard so much. The charges against the originators, Mon. Secretan and Mons. Laveissière were—t very serious in British commercial eyes, and the other not so serious. From our very high standpoint of principle we look upon the declara-

ious dividends as certainly bad, if discovered. Generally speaking, sin is not so great if it does not come to light; and yet this tious dividend facturing is done in the open daylight every day of year. The system obtains in concerns in the directorate list of ch rank the names of men high in standing, and to all appearances ve suspicion. These Frenchmen at the head of the Society de aux are now in goal, because they created apparent profits—profits llen to more than normal extent by placing on certain material an ficial and exaggerated value. We are not a bit sorry for them. To a commonplace phrase, they went the whole hog. They wanted to opolise an entire department of trade. They thought there was a nce to succeed. They ran the risk, knowing it was a risk, and they d not who fell if they did not fall, and thought not of the ruin they id wreak on those who fell when they were unable to meet their agements. But this creating an apparent profit, by setting on given k an exaggerated and artificial value, is no worse than we see done very great centre day by day. Do we not see bogus companies ted—a large capital offered for subscription for the purpose of ing up a business that is not worth one tithe of the amount inally asked? The one case is every bit as bad as the other, and ould indeed be a happy day for commercial England if some drastic lative action were taken which would make a directorate directly onisable for the statements in prospectuses, and ensure that inflated itals should not be raised upon flimsy concerns which, when they e posed on paper before a gullible public, lead to disappointment l subsequent bankruptcy.—*Liverpool Journal of Commerce.*

Our Book Shelf.

THE TWENTY-FIFTH AND TWENTY-SIXTH REPORTS of the Chief Inspector of Alkali, etc, Works; being his proceedings during the years 1888 and 1889. London, Eyre & Spottiswoode: Extreme pressure of business, at this time last year, compelled us to t the former of these two reports aside, until a more convenient son for detailed notice. A year has passed and gone, and though may be charged with procrastination, we may urge, in defence, that has given the opportunity for a comparison of two year's work, thin the precincts of the same notice. But *revenons a nos montons*, the 25th report tells us, that in England d Ireland there were 926 works registered at the close of 1888, ile, from the 26th report, we gather that only 903 works were istered in 1889. As a total, there were 1,057 registered works in : United Kingdom at the end of 1888, but only 1,032 at the close 1889.

Passing over the details of "visits to works, and tests made" in the th report, we may make passing reference to the statement, that in the case of hydrochloric acid, "the average of the whole amount aping, is 0.089 grain of hydrochloric acid per cubic foot of air; an ount slightly less than that of previous years.

The 26th report, in referring to the escape of hydrochloric acid, says : the limit laid down in the Alkali Act is 0.20, or two-tenths of a grain. is satisfactory to note that the average for the whole year is distinctly ow the half of this, or only 88, in the place of the 200. This is most identical with the figure 89, reached in the year 1888.

While giving due praise to the inspectors for the energies with hich they have carried on their investigations, every one who has ecial knowledge of the alkali trade must agree that the cause of the minution of escapes of acid gases is not to be found in Government pection. We may go even farther than this, and say that the alkali ade has suffered to an immense extent, measured, perhaps, in millions pounds sterling, by the indirect action of the Alkali Acts. We are ite aware that several leaders of the trade have expressed the inion that inspectors are blessings in disguise, but human nature is, all the world over, a tendency to greater activity in the tongue, an to foresight in the brain.

If, then, the diminution of the escape of acid gases be not due, in the ain, to Government inspection, to what is it due? To reply is easy. efore the year 1863, in the majority of instances, the alkali manu- ture was carried on in a most crude manner. If we are to credit the atistics published in the first, second, and third reports of the first Chief spector (Dr. Angus Smith), it was no uncommon thing to find 30—40 r cent. of the hydrochloric acid wasted; and, in some cases, *the hole of it*. These were the halcyon days of the soda industry, days hen soda making yielded a handsome profit, without the necessity of oking to the hydrochloric acid as a source of income, but to-day the atter is very different, the ammonia soda process must be looked upon, r a time at least, as the universal provider of carbonate of soda, or hat is commercially known as soda ash, while the Le Blanc process ust supply the world with caustic soda, and if it cannot do so at a

price, at least equal to the causticising of ammonia soda, then it must cease to exist.

But to return to our point, soda ash is now the bye-product, and hydrochloric, the milch cow of the Le Blanc process, therefore it is to the manufacturers interest to secure as much hydrochloric acid as possible. If we take the average escape as 0.089 for 1888 and 0.088 for 1889, we may infer (the difference is but one-thousandth of a grain per cubic foot) that the condensation of hydrochloric acid gas is now as complete as it can be made practically. This, as we have said before, cannot be attributed solely to Government inspection, the various economic changes that have taken place in the allied industries, have had much to do with the question. We have already endeavoured to show that Le Blanc soda ash has had a formidable rival in ammonia soda, but this, so to speak, internal rivalry, is as nought when compared to external effects. At one time, the whole of the soda employed in the paper industry was run away as black liquor into the nearest stream, and as there are considerably more than three hundred paper mills in the United Kingdom, the recovery of this soda, or 70% of it, must be a factor to be reckoned with. There are many mills now recovering from 24 to 30 tons of soda ash weekly, thus securing a greater degree of purity for the streams in the neighbourhood than was heretofore possible. But soda pulp has had a powerful rival in what is known as sulphite pulp, so that the soda trade has not received a corresponding impetus from the growth of the paper trade. The tendency has, therefore, been to carefully nurse the bleaching powder industry and to take advantage of all the knowledge imparted by earlier investigators, first, in increasing the yield of acid from the salt decomposed, and secondly, in wasting less of it in the chlorine manufacture than was done formerly.

If manufacturers have thus benefited, how is it possible for us to establish the proposition, that by reason of inspection "the alkali trade has suffered to an immense extent?" Many of the earlier manufacturers prospered like the green bay tree; the outside world did not know the organisation required in, and the cares and troubles of a chemical business; it was a new occupation for adventurers, a calling in which years of enforced apprenticeship were unnecessary. One cannot wonder, then, that the chemical industry became a centre of attraction, even drawing men from other well-established businesses and walks in life. But it is a notorious fact that many men, enticed from a mechanical calling to one strictly physical and chemical, were totally ignorant of chemical facts. While profits were ample they did not bother their heads in studying manufacturing economy, and chemical economy was out of the question. Many of these works would have gone out of existence, and competition been less keen to-day than it is, but inspection came in and said: "You must stop your extravagant methods, you must economise your waste products, you must poison the land no longer;" and it was so. To the ill-conditioned, ill-constructed, and badly managed works, no doubt inspection is a "distinct benefit to the owners of such works,"* but it is very much open to question whether the Act is a "benefit" to the scientific worker, to the man who can work and be guided by the results of his own investigations, rather than by what he is able to glean from the doings of his neighbours. Judging from the number of prosecutions under the Act, all the works seem to be behaving themselves exceedingly well, so that one is almost tempted to ask is there need for inspection any longer. In the 25th report, nine prosecutions are recorded, but seven of these were for non-registration, and the heinousness of this crime may be gathered from the fact that a firm in Norfolk was fined £30. and costs for non-registration, while another firm was only fined £20. and costs for failing to use the best practicable means for preventing the escape of acid gas from the manure plant. The 26th report states, that there has been only one prosecution during the year 1889, and that for failing to adopt the best practicable means for preventing the escape of sulphuretted hydrogen during the manufacture of sulphate of ammonia. Penalty £10. and costs, while a manure works at Chelmsford the year before were fined £17. for non-registration. Better to register and make a smell, than not to register!

From the 25th report we learn that 590,312 tons of salt were decomposed by the Le Blanc process during 1888, and the 26th report gives us the information that 584,203 are the figures for 1889.

In the 25th report, on page 13, when recording the progress of sulphur recovery from alkali waste, the chief inspector says "great care will be needed in preventing all escape of the sulphuretted hydrogen, a highly poisonous and offensive gas. It will be the duty of the inspectors under the Alkali Act to see that none of it passes into the atmosphere, but that the last traces are uniformly retained." Have the inspectors done this? The 26th report is most unsatisfactory on this point. It does seem to us a case of special pleading when a small producer of sulphuretted hydrogen is fined £10. and costs, while a hundred times the quantity is let loose in Widnes, but there, Widnes has a special inspector to itself.

* We borrow these words from Mr. A. M. Chance, which may be found on page 10 of the 25th report of the Chief Inspector of Alkali Works.

Considerable space is taken up in the 25th report with a description of plant, used for suppressing the nuisance arising from the escape of sulphuretted hydrogen. In a multitude of counsellors there is wisdom, but he will be a clever man who can tell the *best practicable means* from the digest of the 117 cases therein contained.

The production of salt seems to have fallen from 2,039,867 tons in 1888, to 1,792,790 tons in 1889.

From the report of Dr. Affleck, on the Widnes district, we gather that "the nitric acid process, patented by Mr. Donald (for the production of chlorine), and which was alluded to last year, has not yet proved to be a success on an industrial scale and has been abandoned in the Widnes works, where it was being tried during the past 18 months."

The reports of all the district inspectors are very interesting reading, and especially so to ourselves, but we would give a hint that it may be well to regard. Assuming that a register number is necessary to conceal the identity of the works, it would be better to curtail the list of "additions and improvements" thus, on page 36 it is easy from the information there given to lift the curtain of concealment, even by an outsider, and to residents in the vicinity there is no concealment at all.

THE FIFTH ANNUAL REPORT of the Board of Gas and Electric Light Commissioners of the Commonwealth of Massachusetts, Boston. Wright and Potter. 1890.

This is a public document of 208 octavo pages, from which a great deal of useful information may be gleaned, especially that relating to water-gas and to the employment of electric lighting in the State.

In another column we publish some of the remarks upon water-gas, which may prove of service to our readers, and below is given a portion of the report of the Gas Inspector which goes to show generally what is done with regard to these matters in America.

"The tests of the gas of the larger companies were always made at some distance from the works, and usually at the companies' offices. The gas of the smaller companies was tested at hotels and town halls, as well as the companies' offices. The inspections have been made at rather irregular intervals, and no notice has ever been given when they were to occur, so as to avoid giving the companies any opportunity of preparing a special quality of gas, if they had any such desire. More inspections have been made in the fall and winter months than in the spring and summer months, so as to follow the production of gas to a certain extent. At Chicopee, Dedham, Fitchburg, Gloucester, Manufacturers' of Fall River, Marlborough, Plymouth, and Webster, the inspections were made at the works, as there seemed to be no other place available.

The results of the tests made during the year by the inspectors, and given in the following table, were furnished to the Board of Gas and Electric Light Commissioners at their request.

Number of Inspections made.	NAME OF PLACE OR COMPANY.	CANDLE-POWER.			GRAINS PER 100 FEET OF GAS OF	
		Average.	Highest.	Lowest.	Impur.	Ammonia.
52	Boston ..	17'91	19'3	16'5	10'59	5'86
10	Brookline ..	18'31	18'7	17'8	9'57	4'80
20	Cambridge ..	17'29	18'3	16'1	11'44	2'16
14	Charlestown ..	17'17	18'1	16'0	11'59	1—
7	Chelsea ..	18'67	19'2	17'6	9'61	1'20
10	Dorchester ..	17'01	18'3	15'6	10'71	2'85
8	East Boston ..	18'04	19'0	17'4	10'22	4'71
9	Fall River ..	18'94	22'1	17'2	9'03	1'74
9	Haverhill ..	18'32	19'5	17'7	9'96	6'80
9	Holyoke ..	17'86	18'6	16'1	8'14	3'62
7	Jamaica Plain ..	17'57	18'0	17'0	9'84	2'80
14	Lawrence ..	17'21	18'2	15'7	10'34	1—
33	Lowell ..	18'11	18'8	17'4	10'98	1'63
9	Lynn ..	18'18	19'1	17'5	12'43	1—
7	Malden ..	17'33	18'2	16'4	10'11	3'14
9	New Bedford ..	17'26	18'4	16'5	8'88	1'14
9	Newton ..	17'58	18'3	17'1	12'16	1—
25	Roxbury ..	17'97	19'8	17'0	10'39	6'09
8	Salem ..	18'00	18'6	17'3	7'25	3'02
12	South Boston ..	17'80	18'5	17'0	9'88	8'23
14	Springfield ..	18'58	19'4	17'5	9'72	2'10
7	Taunton ..	17'69	18'1	17'3	8'29	1'11
7	Waltham ..	17'74	18'5	16'9	6'06	4'53
18	Worcester ..	17'97	19'3	15'3	11'54	1—
	Average ..	17'85	—	—	9'91	2'98

Number of Sample.	Candle-power.	Coal Gas.	Mixture of Coal Gas, Petroleum Gas, and Water Gas.	PLACE OR COMPANY.	Marsh Gas.	Hydrogen.	Carbonic Oxide.	Nitrogen.	Oxygen.	Carbonic Acid.
1	18.5	6.92	35.85	Boston ..	31.07	44.79	6.89	1.28	0	0.43
2	17.6	4.87	36.46	Lowell ..	34.78	46.35	6.10	1.18	0	1.27
3	16.4	4.90	37.21	Lawrence ..	33.08	43.85	6.35	1.11	0	1.52
4	17.8	6.61	36.06	Charlestown ..	34.24	48.43	7.30	1.00	0	1.46
5	17.2	5.43	34.87	"	30.79	48.52	6.86	1.08	0	1.94
6	18.0	7.17	36.55	Worcester ..	34.15	50.26	5.46	4.57	0	1.35
7	—	4.74	34.10	Lynn ..	38.72	51.24	6.70	2.80	0	1.13
8	—	5.68	38.72	South Boston ..	—	47.70	6.99	0.85	0.06	0
9	19.8	8.53	31.07	Roxbury ..	31.07	44.79	14.50	0.88	0	0.23
10	18.8	8.80	34.78	"	34.78	46.35	9.15	0.92	0.69	0
11	17.5	6.33	33.08	"	33.08	43.85	9.33	0.92	0.69	0.05
12	17.4	5.61	34.24	"	34.24	48.43	7.11	4.77	1.13	1.24
13	20.6	6.58	30.79	Fall River ..	30.79	48.52	12.67	3.44	0.89	0.52
14	18.0	5.63	34.15	"	34.15	50.26	8.77	1.84	0	0.26
15	17.2	4.44	35.41	"	35.41	51.20	6.77	1.11	0	1.07
16	17.5	6.68	32.81	"	32.81	52.41	8.26	1.11	0	1.30
17	17.9	7.25	25.14	"	25.14	42.44	21.90	3.74	0	1.70
18	20.7	11.93	29.87	"	29.87	36.78	18.62	1.87	0	0.99
19	18.5	5.78	35.69	Dorchester ..	35.69	49.15	7.29	1.87	0.03	0.98
20	17.2	7.87	30.59	"	30.59	43.13	12.37	4.04	0.34	1.66
21	18.0	7.00	30.59	"	30.59	46.24	10.07	3.15	0.32	1.33
22	20.8	9.48	31.73	Spencer ..	31.73	36.09	14.76	3.12	0.12	3.89
23	16.7	7.93	29.63	"	29.63	42.20	13.51	4.29	0.15	2.45
24	16.7	9.60	34.87	"	34.87	35.42	14.20	3.05	0.15	2.05
25	14.3	7.07	30.66	Athol ..	30.66	42.71	14.82	0.00	0.00	0.00

PETROLEUM NOTES.

RUSSIA'S GAIN FROM OIL.

WHILE the presence of oil in New Zealand encourages the thought that England may some day become the petroleum pot of the South Pacific, the opening up of Persia to British trade attention to a quarter too long neglected by this country. More than once I have expressed the opinion that the development of petroleum at Baku has done more to expand and consolidate Russia's position in the Caspian region than all the military successes against the Turks and the annexation of Merv and Penjdeh. When the Nobels came to their oil operations at Baku ten years ago, that corner of the Caspian was far less developed than Burma is to-day. The town was unknown, no railway connected it with the Black Sea, and the Caspian had the reputation of being almost as barbarous and backward in commercial activity as the Sea of Aral. In the interval, the population of Baku has risen from 15,000 to 75,000 people. Its wells produce 100 million gallons of crude oil every year. More than 100 refineries stretching along the coast of Baku Bay, turn out 200 million gallons of refined oil annually. From the forty piers are exported 100 million tons of refuse oil to provide fuel for 1000 steamers, locomotives and factory engines in various parts of Russia. Over 1000 oil stoves are incessantly running from Baku to the Volga. From the 10,000 tank cars are employed in conveying the oil by rail to various parts of the empire. Hundreds of iron reservoirs, of different centres, provide accommodation for 120,000,000 gallons. The Trans-Caspian railway, nearly 100 miles long, uses firewood for extremity to the other oil fuel, and no other. On the Volga, liquid is replacing wood and saving the forests from ruthless destruction. At Baku, thanks to the millions of gallons of oil pouring through

ope, keeping a fleet of tank steamers incessantly employed, a ble Turkish town has developed in a few years into a powerful prosperous mercantile community, exporting to India alone last 7,000,000 gallons of petroleum, of which a million gallons went very Burma where our eastern oil fields are situated. Finally, a xcise tax on kerosene, newly imposed last year, yielded nearly quarters of a million sterling, and enabled the Minister of Finance lare the best budget for thirteen years.—*Marvin's "Our Un-iated Petroleum Empire."*

RAILWAY TRANSMISSION OF PETROLEUM.

Liverpool Mercury has the following:—"Nature is bounteous provision she has made for the supply of petroleum oil on the ents both of Europe and America, and the results are an ous development in the trade, and in the requirements neces- for the storage and transportation of that commodity. Tank ers are rapidly replacing sailing vessels, and comprehensive gements have been or are being made for storing the oil in There are, indeed, several private establishments and a er of public wharves where storage tanks have been erected relieve the distributor of investing capital in expensive installa- as they are now required, and place at the disposal of shippers oil-producing countries additional means of assisting them in trade, which cannot fail to be of the greatest advantage. In Britain and Ireland there is storage capacity, approximately, 9,500 barrels. Liverpool and Birkenhead alone have accommo- for 236,500 barrels, and Barrow, which is a distributing for the Liverpool market, for 100,000 more. But the problem as to be solved as to the carrying of the oil in bulk from the by railway into the interior, and this is a question which requires s consideration. The storage and carriage of petroleum are by ans unattended with danger, and it is obvious that for the : safety the traffic must be conducted under very strict regula- —*Liverpool Journal of Commerce.*

THE PETROLEUM FIELDS OF INDIA.

India petroleum occurs in Upper and Lower Burmah (including rakan Islands), in Assam, in the Punjab, and in Beloochistan. rakan the most productive fields are believed to be those of i and the eastern Baranga Island, in both of which localities eum of a very high quality, in some cases sufficiently pure to able of being burned in ordinary lamps in its crude state has been ed. In India, as in Russia and Galicia, owing to the dis- l character of the strata in which the petroleum is found, drilling ended with difficulties. The most abundant supplies of oil were obtained from the wells at Khatan, any one of the five wells ly drilled being capable of furnishing the entire supply of 50,000 s of oil a year, which is estimated to be the amount required for ind-Pishin section of the North-Western Railway. From the of view of the kerosene manufacturer, the Arakan oil was the but, on the other hand, much of the Yonangyoung oil yielded a percentage of paraffin, which was a valuable product; and the of kerosene from the latter oil was capable of being largely sed by the newly-adopted processes. Too little was at present n about the oil fields of India to admit of a confident prediction their future. Unless the necessary operations were carried out skilful, energetic, and experienced management, disappointment discouragement would probably ensue, and the development of l fields of India would be retarded. The action of the Indian nment in proposing to sell the oil-producing territories in sections, d of granting prospecting licences, is likely to afford some guarantee cient development.

SALFORD SEWAGE EXPERIMENTS.

THIT millions of gallons of sewage per day, and how to dispose of it? is the problem which—owing to the progress of the Man- r Ship Canal—the Salford Corporation finds itself compelled to

Under ordinary circumstances the addition of such an effluent river Irwell obviously raises many serious questions, but, when nsider that the flowing, if not silvery, Irwell will, in effect, be by- e converted into a series of docks or settling ponds, more or less ant, it will at once be seen that some process which, after treating wage matters, gives an inoffensive and stable effluent, becomes solute necessity. Up to the present, Salford has adopted the process of precipitation, which, as is well known, will not suffice et the more stringent requirements of the future. Therefore, a month ago, the Salford Corporation invited promoters and ees of various systems of sewage purification to institute experi- l trials at Mode Wheel, so as to show the results which could ly be obtained from Salford sewage.

ae of these experiments have now been undertaken by the Inter- al Water and Sewage Purification Company, Limited. This

company's system is already in operation at several places in the neighbourhood of London, and several provincial authorities have decided upon its adoption. In this system a patented reagent styled "Ferozone" is used as a precipitant. Without commenting upon the nomenclature, we may say this compound as been analysed, and stated to contain principally sulphate of iron and magnetic oxide of iron, besides salts of alumina and magnesia. It is stated that the quantity required for the complete precipitation of all impurities ranges from five to eight grains per gallon, or seven to ten cwts. per million gallons of sewage. As this is only one-half the precipitant added in the lime process, and less than one-tenth of the weight added in some other processes, the statement has important bearings on the quantity of sludge which ultimately has to be disposed of. All precipitants naturally add to the amount of sludge to be eventually dealt with, and, of course, from this standpoint, the system which adds the least is the best. At Salford sewage works, about three grains of "ferozone" are added per gallon of sewage, which is then allowed to flow into a settling tank of some ten thousand gallons capacity, where it is allowed to become perfectly quiescent while an alternative and similar tank is being filled. After settling for two or three hours, the supernatant liquid is run into one of two alternate filters of some forty square yards area each, which consist of: first, a top layer of sand nine inches deep, then twelve inches mixed "polarite" and sand, under which are further layers of sand, peagravel, and shingle, in which are embedded the pipes for carrying away the effluent. It is said that effective filtration can be carried on at the rate of one thousand gallons per square yard per twenty-four hours. From an analysis of "polarite"—which is the active ingredient of the filter—it appears to consist of something like fifty-three per cent. of magnetic oxide of iron, twenty-five per cent. of silica, and some lime and magnesia. The magnetic oxide of iron is familiar to most of us as blacksmiths' scales, and is a mineral well known to metallurgists; but its use as a filtering medium is somewhat novel, and, so far—in towns where it has been tried, as at Acton, Tottenham, Hendon, &c.—it appears to have given satisfaction. For the purposes of the "International" system, the natural ore is sub- mitted to a special treatment before use as a filtering medium. It might be thought that after continuous use the filters would be liable to clogging by arrested impurities, but, on this point, it is stated that after the filter beds at Acton had been in use for fourteen months, the only cleansing had been the removal of the surface layers of sand. The Borough Engineer of Salford reports that the amount of sludge by the "International" system is less than half that produced by the ordinary lime treatment. Moreover, after the sludge has been pressed into bricks, burnt and ground up, it is said to be sold at Acton for manure at thirty shillings per ton. As sludge has generally been looked upon as a dead loss, such a result in Salford would be a valuable feature if it could be disposed of at anything like this price.

Electrolysis is to be applied to the sewage by the Electrical Purifica- tion Association, Limited, a company which has been formed to work the system of sewage treatment patented by Mr. William Webster, F.C.S., whose experiments at Crossness have recently attracted atten- tion. No chemicals are added, and, after electrolysis, the impurities separate by gravitation, and the effluent is said to be quite free from any tendency to putrefaction. At the experimental works, the crude sewage is passed through a channel of brickwork ninety feet long, four feet nine inches broad, and about fourteen inches deep. In this channel are suspended three hundred and sixty-four common cast iron electrodes, four feet deep, two feet eight inches wide, and half an inch thick. These are, for electrical reasons, divided into twenty-eight sections of thirteen plates each, and connected by copper strips to a sixty-five volt dynamo. The plates are hung longitudinally in the channel, so as to present their edges to the flow of the sewage, and as they are only five-eighths of an inch apart, every particle of sewage is subjected to the action of the electric current. Some of the impurities separate themselves as a flocculent mass buoyed up by the liberated gases at first, but, after remaining in a settling tank for a time, they fall to the bottom, and the supernatant liquid is the purified effluent. As the dissolved iron is the only addition, and as this only amounts to two grains of iron per gallon of sewage treated, or two cwts. of cast iron per eight million gallons per day, it is claimed that the amount of sludge formed is less than by any other process. Chemists who have reported on the trials of this process state that none of the effluents showed any signs of putrefaction, and also, that they showed a marked absence of sulphuretted hydrogen, and any filtration was superfluous.

The results of these experiments will be awaited with considerable interest; for while the question is a very pressing one in Salford, it is of vital importance to many other towns in the United Kingdom. We understand that among other systems to be experimentally tried will be the fish brine or "Amines" process.

A HORN PITH SYNDICATE.—We learn that a syndicate contem- plating the purchase of all the horn pith works in this country.

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

- JOSEPH AIRD, GREATHRIDGE.—Iron tubes and coils of all kinds.
- ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Gas Plant generally.
- BLACKMAN VENTILATING CO., LONDON.—Fans, Air Propellers, Ventilating Machinery.
- GEO. G. BLACKWELL, LIVERPOOL.—Manganese Ores, Bauxite, French Chalk. Importers of minerals of every description.
- BRACHER AND CO., WINCANTON.—Automatic Stills, and Patent Mixing Machinery for Dry Paints, Powders, &c.
- BRUNNER, MOND AND CO, NORTHWICH.—Bicarbonate of Soda, Soda Ash, Soda Crystals, Murate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.
- BUCKLEY BRICK AND TILE CO, BUCKLEY.—Fireclay ware of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.
- CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Driers and Steam Traps (McDougall's Patent).
- W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.
- CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Salt, Benzole, Toluole, Xylole, and Nitro-compounds of all kinds.
- J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps and Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.
- R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Plant—Blowing Engines, Filter Presses, Sludge Pumps, &c.
- DAVIS BROS., MANCHESTER.—Samples of Products from various chemical products—Coal Distilling, Evaporation of Paper-lyes, Treatment of waste liquors from mills, &c.
- R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Plants, Holders, Condensers, Purifiers, &c.
- DOULTON AND CO., LAMBETH.—Specimens of Chemical Stoneware, Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.
- E. FAIRIG, PLAISTOW, ESSEX.—Ozonised Products. Ozone-Bleached Esparto-Pulp, Ozonised Oil, Ozone-Ammoniated Lime, &c.
- GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.
- GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Sizin Materials, India-rubber Chemicals.
- JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters.
- JOSEPH KERSHAW AND CO, HOLLINWOOD.—Soaps, Greases, and Varnishes of various kinds to suit all requirements.
- C. R. LINDSEY AND CO, CLAYTON.—Lead Salts, (Acetate, Nitrate, etc.) Sulphate of Copper, etc.
- CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Carbolic Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants, &c.
- MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours. Samples of Dyed Goods and Miscellaneous Chemicals, both organic and inorganic.
- MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhausters, Silent Boiling Jets, Air Compressors, and Acid Lifters.
- E. D. MILNES AND BROTHER, BURY.—Dyewoods and Dyewood Extracts. Also samples of dyed fabrics.
- MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Makers of all kinds of heating appliances.
- NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, Recovered Sulphur, etc.
- ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings, illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent Valves.
- J. ROYLE, MANCHESTER.—Steam Reducing Valves.
- A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitute, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, and Disinfecting Fluids.
- WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pumping Machinery. Speciality, their "Duplex" Pump.
- JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-water Heater. Makes also of Multiple Effect Stills, and Water-Softening Apparatus.

SOCIETY OF CHEMICAL INDUSTRY

LONDON SECTION.

THE last ordinary meeting of the session was held at the House on the 2nd inst., Mr. David Howard in the chair. The Secretary, Mr. Tyrer, having read the minutes of the last meeting, announced the arrangements made for the annual general meeting which will be held at Nottingham, Mr. Cross, before the meeting of the evening, exhibited and described an ingenious apparatus devised by Mr. Watkins, of Hereford, for determining photographic exposures, the excellent work resulting from its use being demonstrated by a series of photographs taken under most diverse conditions. Mr. Cross then read the paper by himself and Mr. Bevan, entitled "Considerations on the chemistry of Hypochlorite Bleaching," the authors confined themselves to bleaching by means of hypochlorite this instance, and discussed various points, the elucidation of which was desirable. A fact which their work had brought into prominence and which was generally overlooked, was the chlorination of that commonly occurred. The degree to which this took place depended on many circumstances, notably on the particular hypochlorite used, it being greater in the case of calcium hypochlorite than of magnesium hypochlorite prepared by double decomposition of bleaching powder, while this again caused more chlorination of the bleaching solution got by the electrolysis of magnesium. Moreover, the amount of chlorination varied according to the material bleached, material such as linen subjected to bleaching "suffering less than that which was only 'white' bleached, because the former had had its fibres freed from except pure cellulose by previous drastic treatment with whereas the impurities contained in the latter were capable of chlorine to a considerable extent, rendering the consumption of chlorine relatively high. That chlorination of the fibre actually proved in the case of esparto pulp, both by analysis and by from it an organic oily body which contained chlorine. This chlorine at once differentiates hypochlorite bleaching from bleaching by means of pure oxidants, such as permanganate and hydrogen peroxide, and the cause assigned for it is the presence and activity of oxygen in the fibre.

It being necessary in the course of the investigation to establish a free base in hypochlorite solutions, the authors, after an examination of the methods already in use, devised the following process, and found it as preferable to all of them. To the solution to be bleached, hydrogen peroxide of known acidity is added to destroy hypochlorite, after which the free base can be titrated with standard solution of the ordinary way. It was found incidentally that the quantity of lime per unit volume in filtered solutions of calcium hypochlorite is approximately constant whatever the strength of the hypochlorite solution. In other words, the proportion of lime referred to the available chlorine varied inversely as the concentration of the liquor.

With regard to the question of bleaching efficiency, experiments have shown that of the several factors of importance a high temperature, though increasing the speed, is wasteful of bleach, and tends to tender the fibre, while the presence of much free base is detrimental to the fibre and giving a poor colour. The whole subject needs much patient and intelligent study.

In opening the discussion the Chairman pointed out that linen bleached in the days of our grandmothers could still be obtained in quality with modern productions, and congratulated the authors on their contribution to our knowledge. Dr. Thorne, from his own experience many of the authors' statements, particularly as to the formation of organic chlorinated compounds, some of which were volatile and could be detected by the sense of smell during the process of bleaching. It was to the loss of such substances away by the current of inert nitrogen that he attributed the air to facilitate bleaching when used in conjunction with bleach, although the use of oxygen undiluted proved effective also commented on the tendency of pulp bleached hot, to redden after 10–12 hours. After a brief reply by Mr. Cross, Mr. Thorne moved a vote of thanks to Mr. David Howard for his services as chairman for so long a period, the motion being seconded by Mr. Samuel Hall, and carried with acclamation. Mr. E. E. replying said that he hoped to be present frequently, though not at future meetings. Dr. Thorne then proposed a vote of thanks to the honorary secretary of the section, Mr. Tyrer, now resigning his position to the chair, a motion which found a hearty second from Mr. Howard, and was carried unanimously.

Mr. Watson Smith having exhibited a new form of burner, the chief feature of which was a side slit for the admission of air, instead of the usual vertical tube, together with some modification of the meeting adjourned to Nottingham in July.

ate— 600 bgs.	Glucose— New York, 208 brls.	Chemicals (otherwise undescribed) Dunkirk, 79 pks. Wilson, Sons & Co. Antwerp, 138 Hamburg, 245 Bremen, 1 cs. 11 kgs. "Veltmann & Co.	Pitch— Dunkirk, 56 cks. Wilson, Sons & Co. Plumbago— Hamburg, 42 cks. 21 bls. Wilson, Sons & Co.
al, 10 brls. Makin & Bancroft 20 Haines & Co.	Manganese Chlorate— Rotterdam, 1 ck.	Genoa, 16 cks. Wilson, Sons & Co. Marseilles, 5 Rotterdam, 1 W. & C. L. Ringrose Dunkirk, 22 pks. Wilson, Sons & Co.	Sulphur— Catania, 868 pks. Wilson, Sons & Co. Turpentine— Libau, 50 bls.
um Prussiate— am, 4 cks.	Pyrites— Huelva, 1,195 t. Tharsis Co.	Dyestuffs— Cutch, 1 bl. G. Lawson & Sons Argols Bari, 24 cks. Wilson, Sons & Co.	Tar— Marseilles, 25 cks.
1,550 t. Matheson & Co. 1,340 Tenants & Co.	Stearine— Antwerp, 12 bgs.	Extracts Rouen, 58 cks. Rawson & Robinson Fiume, 700 bls. Wilson, Sons & Co. Dunkirk, 25 cks. "	GRIMSBY. Week ending May 17th.
1 Wax— ork, 100 bds. Meade, King, & Co.	Saltpetre— Hamburg, 48 cks.	Sumac Bordeaux, 100 bls. Rawson & Robinson Trieste, 20 bgs. Wilson, Sons & Co. Palermo, 376 350	Glucose— Hamburg, 14 cks.
1, 440 bgs.	Sulphur Ore— Bergen, 300 t.	Alizarine Rotterdam, 78 cks. W. & C. L. Ringrose " 20 G. Lawson & Sons " 5 W. & C. L. Ringrose " 20 pks. " " 21 cks. Hutchinson & Son	Kainit— Hamburg, 500 bgs.
re— 1, 1,199 109 W. & R. Graham & Co.	Tartaric Acid— Rotterdam, 4 cks. J. Rankine & Son	Rennet Copenhagen, 8 cks. Wilson, Sons & Co. Rotterdam, 5	GOOLE. Week ending May 14th.
8— am, 3 cks. 20 bgs.	Ultramarine— Rotterdam, 5 cs. J. Rankine & Son	Fustic Hamburg, 317 pcs. Wilson, Sons & Co.	
1, 140 bgs.	Waste Salt— Hamburg, 320 t. " 271 cks.	Glucose— Hamburg, 6 cks. Wilson, Sons & Co. " 8 C. M. Lofthouse & Co. Stettin, 210 bgs. Wilson, Sons & Co. " 11 cks. M. Whitfield & Sons " 23 Hull Dock Co. " 200 bgs. Thompson, McKay & Co.	Alum— Rotterdam, 21 cks.
1, 32 brls.	TYNE. Period ending May 20th.	New York , 80 cks. Bailey & Leatham Hamburg , 12 " 200 bgs. Bailey & Leatham " 12 cks. Bailey & Leatham " 17	Barytes— Antwerp, 50 bgs.
2 cks.	Barytes— Antwerp, 50 bgs. Tyne S. S. Co.	Kainit— Hamburg, 500 bgs. G. Lawson & Sons	Antwerp , 50 bgs.
ix, 38 am, 1	Glucose— Hamburg, 50 bgs. Tyne S. S. Co.	Manure— Ghent, 160 t. Rouen, 4 cks. Rawson & Robinson	Chrome Alum— Rotterdam, 30 cks.
1, 1	Rock Salt— Hamburg, 150 t.	Naphthaline— Hamburg, 1 brl. Wilson, Sons & Co.	Dyestuffs— Alizarine Rotterdam, 61 pks.
1, 494 bgs. 640	Salt— Hamburg, 150 t.	Oxide— Rotterdam, 4 cks. Hutchinson & Son	Madders Rotterdam, 5 cks.
	Tartaric Acid— Rotterdam, 4 cks. Tyne S. S. Co.	Pyrites— Huelva, 1,513 t. J. Dalton, Holmes & Co.	Logwood Jamaica, 559 t.
GLASGOW.	Zinc Oxide— Antwerp, 20 brls. Tyne S. S. Co.		Dyestuffs (otherwise undescribed) Antwerp, 5 cs. 97 cks.
Week ending May 22nd.	HULL. Week ending May 22nd.		Glucose— Hamburg, 48 cks. 200 bgs. Calais, 100
am, 45 cks.	Acetic Acid— Rotterdam, 10 pks. Hutchinson & Son		Manure— Phosphate Rock Ghent, 800 bgs.
1, 100 bgs.	Acids (otherwise undescribed) Rotterdam, 1 ck. W. & C. L. Ringrose		Potash— Hamburg, 100 bgs. Calais, 117 drs. Dunkirk, 58 cks.
1 Ore— am, 2,100 bgs.	Barytes— Bremen, 62 cks. Antwerp, 38 brls. H. F. Pudsey		Saltpetre— Hamburg, 20 cks.
1, 89 cks. J. Rankine & Son	" 18 cks. "		Sodium Silicate— Rotterdam, 1 ck.
am, 1 ck J. Rankine & Son	Bremen, 23 Tudor & Son		Waste Salt— Hamburg, 537 t. 1,015 bgs. 662 cks
ork, 27 cs.	" 23 T. W. Flint & Co.		
p, 1 ck. 1 cs.	" 23 J. W. Davis & Son		
1, 9 t. 15 c.	" 18 "		
Wallace	Bones— Trieste, 2 pks. Wilson, Sons & Co.		
Wilkie & Co.			
ne— am, 5 cs.			

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON. Week ending May 14th.	Carbolic Solid— Barcelona, 10 c. £70 Yokohama, 1,000 lbs. 57	Phosphoric Acid— Demerara, 5 t. 10 c. £86	Bleaching Powder—continued. New York, 452 cks. 168 tcs.
Sulphate— am, 85 t. £1,020 ch, 125 1,500	Carbolic Acid— Algoa Bay, 3 cs. £39	Potassium Chlorate— Sydney, 5 t. £211 New York, 10 c. 28	Vera Cruz, 60 brls.
1 t. £15	Calomel— New York, 20 cs. £164	Sheep Dip— Algoa Bay, 1 t. 5 c. £66 Pt. Elizabeth, 6 15 300	Antwerp, 27 21 brls. 44 kgs.
Sulphate— 15 cs. £27	Copperas— Melbourne, 5 t. 13 c. £13	Salammoniac— Aden, 1 t. 1 c. £37 Sydney, 13 24	Bilbao, 28 85 tcs.
ork, 8 cs. £67	Disinfectants— Sydney, 43 cs. £91 Penang, 200 gls. £30	Salicylic Acid— Singapore, 2 c. £17	Carthagena, 10
me, 18 c. £36	Guano— Barbadoes, 30 t. £300 " 320 3,200	Zinc Ashes— Antwerp, 21 t. 16 c. £400	Genoa, 58
Sulphate— 2 t. £49 5 125	Manure— Berbice, 20 t. £205 Rotterdam, 60 510 Antigua, 25 4c. 306 Riga, 50 150		Ghent, 23
acid— 1 c. £8	Nitric Acid— Jersey, 2 t. 7 c. £43		Hamburg, 28
ma, 5 cks. 2 £14	Potash— Mebourne, 5 c. £22 Gothenburg, 10 22		Havanna, 8
o, 1 cs. 20 £43	Potassium Cyanide— B. Ayres, 2 cs. £20		Leghorn, 10
rsburg, 1 t. 149			Malaga, 5 30 pps.
rg, 2 kgs. 43			New York, 298
s, 5 brls. 105			Philadelphia, 48
nts— ix, 45 cks. £90			Rio Janeiro, 20 cs.
		LIVERPOOL. Period ending May 17th.	Rouen, 44
		Bleaching Powder— Barcelona, 70 cks. 84 tcs. 25 cs.	Caustic Soda— Stettin, 6 dms.
		Boston, 421	Trieste, 23
		Calcutta, 2	Valparaiso, 70
		Genoa, 67	Stockholm, 25
		Halifax, 2	Adelaide, 32
		Hamburg, 27 20 kgs.	Algiers, 5
		Lisbon, 29	Amsterdam, 25
		Montreal, 32 tcs.	Antwerp, 36 14 cks.
		New Fairwater, 57 cks.	Batoum, 138
			Bilbao, 20
			Bordeaux, 37

Caustic Soda—continued.

Calcutta, 10 dms.		
Dunkirk, 6		
Galatz, 100		
Genoa, 116		
Gothenburg, 5		
Hamburg, 498		
La Guayra, 46		
Leghorn, 28		
Lisbon, 18		
Madeira, 5		
Madrid, 10	20 brls.	
Marseilles, 45		
Melbourne, 34		
Messina, 80		
Montreal, 483		
Naples, 20		
New Fairwater, 113 dms.		
New York, 1300		
Odessa, 250		
Oporto, 30	8 cks.	
Rotterdam, 26		
Santos, 7		
Bahia, 10		
Barcelona, 300	80	20 brls.
Bilbao, 126		35
Bruges, 6	4	
Genoa, 182		
Gothenburg, 4		
Hamburg, 460		
Hiogo, 70		
Leghorn, 85		
Lisbon, 94	11	4
Malaga, 10		
Manilla, 50		
Montevideo, 200		
Montreal, 100		
New Fairwater, 29		
New York, 250	80 brls.	
Philadelphia, 135		
Piræus, 85		
Puerto Cabello, 11 dms.		
Rouen, 52		
San Sebastian, 40		
Santos, 11		
Seville, 25		
Stettin, 27		
Valencia, 41		
Yokohama, 30		
Gibraltar, 20		
Rotterdam, 54		
Epsom Salts—		
Batoum, 13 cks.		
Maranham, 8		
Rio Janeiro, 100 kgs.		
Maceio, 1		
Magnesia—		
Antwerp, 1 cs.		
Rio Janeiro, 10		
Vera Cruz, 2 cks.		
Salt—		
New York, 25 t.		
Old Calabar, 154 3/4 t.		
Opobo, 45	9 c.	
Para, 177 1/2		
Philadelphia, 30		
Port Mulgrave, 250 t.		
Rangoon, 25		
Rotterdam, 203		
St. John, N.B., 800		
Sandheads, 2145		
Sydney, 50		
Vadsol, 465		
Winnebuh, 10		
Abonnema, 43		
Ambriz, 5		
Amsterdam, 261		
Antwerp, 42		
Benin, 22		
Boston, 156		
Calcutta, 1320		
Cameroon, 4		
Campbeltown, 150		
Halifax, 1410 3/4		
Hamilton, 6 1/2		
Loango, 12 1/2		
Miramichi, 180		
Montreal, 301	10 c.	
Baltimore, 100		
Benin, 23		
Bonny, 36		
Boston, 100	2 cks.	
Bruges, 200		
Chicago, 299		
Coquimbo, 50		
Elobey, 5		
Grand Bassam, 12 t.		
Hamburg, 50		
Manaos, 5 1/2		
Montreal, 223		
Newcastle, 100		
Old Calabar, 115 1/2		
Rouen, 10		
Shediac, 10		
Sydney, 175		
Victoria, 150		
Vigo, 2		

Sodium Bicarbonate—

Bombay, 10 kgs.		
Calcutta, 500	15 cks.	
Genoa, 25		
Halifax, 50		
Havana, 25		
Miramichi, 15		
Montreal, 400	19	
Nagasaki, 200		
Odessa, 100		
Palermo, 20		
Lante, 2	2 brls.	
Ansterdam, 20		
Calcutta, 500		
Hamburg, 20 dms.		
Santander, 40		
Smyrna, 15		

Sodium Silicate—

Barcelona, 32 cks.		
Bilbao, 32	15 brls.	
Galatz, 10		
La Guayra, 10		
Lisbon, 32		
Madrid, 10		
Montreal, 42		
Seville, 25		
Victoria B.C., 32		

Soda Ash—

Oporto, 10 pks.		
Philadelphia, 427 cks.	28 tcs.	
Piræus, 36	brls.	
Sherbrooke, 16 tcs.		
Smyrna, 5		
Varna, 60		
Windsor Mills, 100	222	
Yokohama, 20		
Bahia, 109 cks.		
San Francisco, 79 brls.		
Adelaide, 509		
Baltimore, 50		
Bilbao, 397	130 tcs.	
Boston, 40 brls.		
Constantinople, 7 cks.		
Hamburg, 4		
Hamilton, 120		
Kingsey, 14		
Leghorn, 42		
Madeira, 5		
Madrid, 30		
Montreal, 69	17	
New York, 306	1055	
Baltimore, 378 tcs.	134	
Boston, 10		
Corfu, 50 brls.		
Ghent, 12		
Lisbon, 13		
Monte Video, 10		
Philadelphia, 685		
Puerto Cabello, 10		
Rio Janeiro, 150		
Valparaiso, 15		

Soda Crystals—

Bilbao, 17 brls.	6 cks.	
Boston, 280		
Calcutta, 10		
Malta, 53		
New York, 280		
Singapore, 9		
Victoria B.C., 20		
Monte Video, 67 brls.		
New York, 56		
Portland, 100		
Quebec, 50	12 cks.	
Singapore, 12 cks.		

Tar—

Rouen, 59 t.	14 c.	
Calcutta, 24 brls.		

GLASGOW.

Week ending May 22nd.

Ammonia—		
Hong Kong, 2 t.	18 c.	£70. 10s.
Charcoal—		
Antwerp, 118 c.		£27
Caustic Soda—		
New York, 200 1/2 c.		£56
Copper Sulphate—		
Rouen, 2 t.	16 1/2 c.	£57
Chloride of Lime—		
San Francisco, 306 1/2 c.		£96
Citric Acid—		
Lisbon, 5 c.		37
Dyestuffs—		
Logwood, 8 t.	13 1/2 c.	£69
Epsom Salts—		
Christiana, 50 bgs.		£33
Manganese Oxide—		
New York, 200 1/2 c.		£93

Manure—

Christiana, 2 c.	£1	
Paraffin Wax—		
Barcelona, 10 t.	3 1/2 c.	£280
Oporto, 10	4	250
"	2	79
Bordeaux, 5		132
Fremantle, 1	15	67
Bilbao, 46	3	45
Antwerp, 103		155
Potassium Bichromate—		
Antwerp, 130 3/4 c.		£194
New York, 403		921
Rouen, 16 t.	18 1/2	559
Barcelona, 109		200
Antwerp, 103 1/4		150
Potassium Prussiate—		
Rouen, 116 1/4		£395
Pitch—		
La Rochelle, 628 t.	3 c.	£785
Bilbao, 563	12 1/2	1,005
Soda Ash—		
San Francisco, 310 1/4 c.		£86
Sodium Bichromate—		
New York, 495 c.		694
Rouen, 12 t.	18 1/4 c.	292
Barcelona, 43		60
Superphosphate—		
Christiana, 20 t.		£100

HULL.

Week ending May 20th.

Alkali—		
Harlingen, 94 cks.		
Bone Size—		
Amsterdam, 10 cks.		
Bleaching Powder—		
Drontheim, 30 cks.		
St. Petersburg, 50		
Borax—		
Libau, 7 cks.		
Caustic Soda—		
Libau, 154 drums.		
Riga, 158		
St. Petersburg, 350		
Chemicals (otherwise undescribed)		
Antwerp, 29 cs.	2 cks.	
Abo, 9		
Bombay, 24		
Christiana, 43	20 pks.	
Copenhagen, 6		
Drontheim, 1		
Danzig, 7		
Gothenburg, 35	40	5 334 slbs.
Hamburg, 15		
Harlingen, 4		
Lisbon, 5		
Libau, 14		
Norfolk, 1		
New York, 20		
Rotterdam, 41	28	
Riga, 20	100	
Rouen, 31		
St. Petersburg, 7	188	
Stettin, 6		
Wasa, 14	1 pkg.	
Dyestuffs (otherwise undescribed)		
Antwerp, 1 ck.		
Boston, 5		
Hamburg, 13		
Rotterdam, 1 cs.	5	
Bombay, 43		
Manure—		
Antwerp, 490 bgs.		
Drontheim, 40		
Rotterdam, 491	111 t.	
Pitch—		
Antwerp, 499 t.		
Dunkirk, 113		
Salt—		
Lisbon, 1 cs.		
Tar—		
Christiana, 6 cks.		
Copenhagen, 13		
Gothenburg, 150		
Hamburg, 14		
Stettin, 1		
Wasa, 40		

GRIMSBY.

Week ending May 17th.

Chemicals (otherwise undescribed)		
Hamburg, 12 pks.		
Rotterdam, 10 cs.		

TYNE.

Period ending May

Ammonia—		
Barcelona, 5 t.	17 c.	
Antimony—		
Barcelona, 2 t.	4 c.	
Alkali—		
Hamburg, 3 t.	10 c.	
Aarhus, 2	18	
Rotterdam, 3	11	
Baryta Hydrate—		
Danzig, 5 t.	7 c.	
Barytes Carbonate—		
Antwerp, 10 t.	16 c.	
Baryta Nitrate—		
Antwerp, 6 c.		
Bleaching Powder—		
Norfolk, 1 t.		
Antwerp, 19	1 c.	
"	20	14
Hamburg, 20	18	
Aarhus, 2	16	
Rotterdam, 36	10	
Danzig, 2	18	
Copperas—		
Rotterdam, 2 t.	19 c.	
Caustic Soda—		
Antwerp, 5 t.	3 c.	
Christiana, 7	6	
Iron Oxide—		
Malmo, 6 c.		
Litharge—		
Gothenburg, 9 c.		
Antwerp, 11		
Danzig, 5		
Manure—		
Christiana, 15 t.		
Magnesia—		
Barcelona, 12 t.	3 c.	
Potassium Chlorate—		
Hamburg, 5 c.		
Potassium Bichromate—		
Norfolk, 4 t.	18 c.	
Phosphorus—		
Malmo, 6 c.		
Pitch—		
Malmo, 5 t.		
Sulphur—		
Gothenburg, 10 t.		
Sodium Chlorate—		
Rotterdam, 1 t.	12 c.	
Sodium Sulphate—		
Danzig, 1 t.	10 c.	
Soda Ash—		
Christiana, 10 t.	5 c.	
New Fairwater, 19 t.	12	
Soda—		
Antwerp, 5 t.	7 c.	
Frederickshavn, 6 t.	7	
Huelva, 2 t.	3	
Horsens, 11	8	
Rotterdam, 11	8	
Odense, 10	13	
Superphosphate—		
Christiana, 10 c.		
Tar—		
Malmo, 1 t.	5 c.	
Turpentine—		
Antwerp, 1 c.		

GOOLE

Week ending May

Benzole—		
Antwerp, 24 cks.		
Rotterdam, 48		
Bleaching Preparation—		
Hamburg, 18 cks.		
Copper Precipitate—		
Rotterdam, 242 cks.		
Coal Products—		
Rotterdam, 163 cks.		
Chemicals (otherwise un—)		
Dunkirk, 15 cks.		
Hamburg, 97		
Rotterdam, 25		
Dyestuffs (otherwise un—)		
Ghent, 21 cks.		
Manure—		
Boulogne, 153 bgs.		
Dunkirk, 50		
Rotterdam, 550		
Pitch—		
Antwerp, 531 t.		
Ghent, 106		

THE TYNE CHEMICAL REPORT.

TUESDAY.

market for chemicals has been very quiet during the past week. Sales all round are easier, and in favour of buyers. Bleaching is decidedly dull, and price has dropped half-a-crown a ton in report. Caustic soda is also lower by 5s. per ton. Soda lengthened its discount by 2½ per cent., and crystals are 6d. to 1s. a ton. The quotation for recovered sulphur is nominal, as, owing to a breakdown in the machinery, the process has been stopped for a short time. Makers are also idle, and are not likely to be in the market for this article for a few weeks yet. To-day's quotations are:—Bleaching in softwood casks, £5. per ton; caustic soda, 77%, in £9. per ton; ground, in 3-4 cwt. barrels, £12. per ton; ash, 48.52%, 1½d. per degree, less 5%; soda crystals, in bags, net weight, £2. 14s. 6d. per ton, in 2 cwt. bags, net £2. 12s. per ton; in casks, gross weight, £2. 12s. per ton; of soda, in bulk, 32s. per ton; ground and packed in 12s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of 4½d. per lb., less 5%; silicate of soda, 75° Tw., £2. 10s.; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; phite of soda, in 1 cwt. kegs, £5. 15s. per ton, in 5-7 cwt. £5. 5s. per ton; pure white sulphate of alumina, £4. 10s.; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s.; sulphide of barium, £5. 10s. per ton—all f.o.b. Tyne, or makers' works.

Sales of manufacturing coals continue very firm, although all other of coal are lower. There is an exceedingly heavy foreign demand for smalls, which more than compensates for the great falling in home consumption.

Numberland steam small is 8s. to 8s. 6d. per ton, and Durham 6d. to 10s. per ton.

Bulk of the workpeople employed by the Tyne Plate Glass Co., Limited, South Shields, terminated their engagements on Friday last, after working a fortnight's notice.

It seems that, a few months ago, the men in the various departments of glassworks applied for an advance of wages. It was mutually agreed to refer the matter to arbitration, and Dr. Spence Watson was appointed arbitrator. Three weeks ago the evidence of both sides was completed before the arbitrator, and it was decided that the wages should remain unaltered until his award was made known. His award has not yet been published. The women employed by the firm, following the example of the men, applied for an advance, and suggested that an improved method of working in the women's department, which the firm intended to bring into operation, should be introduced. This demand the company would not entertain, on account of the stoppage of the works. It is expected that some arrangement will be arrived at on the arrival of the chairman of the directors, Mr. Palmer, who is expected in a few days. The number of men employed is about 600.

MISCELLANEOUS CHEMICAL MARKET.

Sales in alkalis is fairly good, and caustic soda is firm all round at makers' prices, with a tendency to further advance, viz.: 74% £8. 17s. 6d. to £9. 70%, £8. 5s.; 60%, white and cream, £7. respectively. Soda ash in steady demand, and prices 1½d. per deg., according to brand. Soda crystals in good demand, and prices firmly maintained at £3. to £3. 5. f.o.b. Liverpool. Bicarbonate slightly easier, at £5. 15s. per ton. Sales of potash dull at 4½d. per lb. Sulphur has been finding outlet for export to the U.S., and prices are steady. Muriatic acid vitriol in less active demand, and prices in buyers' favour. Gunpowder reported rather firmer for future delivery, but spot doing at £4. 17s. 6d. on rails, and £5. for July forward, and port at £5. 5. f.o.b. Liverpool. Sulphate of copper steady at 2s. to £2.5 for June delivery, and makers well booked with it.

Lead acetates and nitrate continue neglected, but prices steady, and there is no pressure of stock. Acetates of lime plentiful, and prices the turn easier—brown at £7. 12s. 6d. to 1s.; grey at £13. to £13. 5s. at usual points. Acetic acids of all kinds quiet, and unchanged in price. Acetate of soda £16. 10s.

Arsenic in good demand, and white-powdered firm in price. Carbolic acids are without material change in position, with a little business passing meantime. Aniline oil and salt are unchanged in prices. Potash, caustic, and carbonate are in price, and in good demand both for early and forward delivery.

REPORT ON MANURE MATERIAL.

The manure season being now almost over, business in material for prompt delivery has during the past week been on a very limited scale, but for forward a large business has been done in mineral phosphates. There are sellers of hot-air-dried bull River Rock at 10½d. per unit, in cargoes c.f. and i. to U.K. Bids of ½d. less are still invited by outside shippers, but we have not heard of any transactions under 10½d. Several cargoes of land rock have been placed at 9½d. per unit, c.i.f. to U.K., and there are still sellers at the price.

Quotations for Somme and Belgian descriptions are without material alteration. Considerable business is reported to have been done in the lower grades, but prices for the higher kinds still rather preclude buying. There is more disposition on the part of sellers of Canadian to meet buyers, and a larger business in this description of rock may now be anticipated. Since the sale of three cargoes of River Plate bones at £5. 7s. 6d. about a week ago, we do not hear of any fresh transactions. Sellers are now asking £5. 10s., delivered good U.K. port, for summer shipment, but nearest value is probably £5. 7s. 6d., the last price paid for March sailing. For River Plate bone ash about the same price would have to be paid, basis 70% phosphate of lime, a large proportion of the production having been sold at something near that figure.

For the present shippers of East Indian crushed bones and bone meal seem afraid of offering for shipment ahead, and there is no business reported. £4. 18s. 9d. bid and refused for crushed Kurraichee bones, and £5. 5s. for Bombay bone meal, for shipment, delivered ex-quay Liverpool. On spot small sales of Bombay meal have been made at £5. 5s. ex-quay, but practically the price is £5. 10s., ex-store for finer quality and £5. 5s. for irregular. There are no crushed bones offering. Value of common grinding bones has improved from 5s. to 7s. 6d. per ton from the lowest point touched, and ordinary parcels would now fetch £4. 10s. to £4. 12s. 6d.; fine, clean, dry lots would realize £4. 15s. to £4. 17s. 6d. per ton ex-quay.

The nitrate of soda market remains very dull in all positions. Spot value is 8s. for fine quality. Due cargoes are worth barely 8s. May-June sailings, ordinary quality, might fetch about 8s. 3d. per cwt., and September-October shipments 8s. 6d. to 8s. 7½d. per cwt. In other ammoniacal material there is nothing of interest to note, prices for dried blood, ammonite, etc., being without alteration. Kainit, scarce at 40s. per ton. Supers, quiet at 46s. 3d. per ton, in bulk, f.o.r., at Works for 26%.

TAR AND AMMONIA PRODUCTS.

The benzol market has retained its firmness, no great change, however, having taken place since our last report. 90s. benzol stands at 3/9, and 50/90s. at 2/9 to 2/10. Carbolic acid is quiet, while creosote, anthracene, and pitch retain their old prices.

Since this time last week there has been a very quiet market in sulphate of ammonia, but the steady tone is, however, maintained, and buyers offer in vain £11. 2s. 6d., most sellers being firm at £11. 3s. 9d. to £11. 5s. f.o.b. Hull, at which price a few transactions have taken place. The value at Leith remains at £11. 3s. 9d. for prompt parcels. The Hull stocks were 450 tons at the end of last week, but no doubt the bulk of it will be cleared off in the usual course. In any case there is no reason for any lowering of prices on this account, although dealers may make use of the fact to depress values.

THE LIVERPOOL COLOUR MARKET.

COLOURS.—There is little change to report in figures this week. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23., Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

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Notices.

All communications for the *Chemical Trade Journal* should be addressed, and Cheques and Post Office Orders made payable to—

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Our Registered Telegraphic Address is—
"Expert, Manchester."

The Terms of Subscription, commencing at any date, to the *Chemical Trade Journal*,—payable in advance,—including postage to any part of the world, are as follow :—

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates :—

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Each additional 10 words 0s. 3d. ,,

Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid, are charged at the Tariff rates, which will be forwarded on application.

COAL SMOKE.

TO strain at a gnat and swallow the proverbial an operation that has aforetime been considered worthy of imitation. Once in a way, the performance be considered instructive, if it be only to demonstrate folly of agitating our minds over small but visible the total exclusion of the invisible ones of magnitude.

Nothing can illustrate these remarks so well as the agitation respecting coal smoke. It is, however, to be perceived in the Metropolis that unless some steps taken to promote legislation against the present method of burning coal in private houses no improvement can be for.

If this be true with regard to visible smoke, it be what we have preached for so long a time. At a delivered in Manchester in 1882, the writer said : "believe that were we to banish all the factories for the round you would have the so-called fogs quite as intense ever. If we wish to clear the atmosphere our first duty is with domestic chimneys. It has hitherto been considered a subject too vast to be dealt with, and our sanitary legislation have perhaps been wise in their generation by practically letting it alone."

An American expert says : " Factory furnaces, however, are not to be charged with all the smoke. If they were of the English cities would be practically smokeless; vast amount of coal consumed for domestic purposes and for the only difficulty they have in clearing the atmosphere in London smoke from factory chimneys is practically prevented, while from those in Paris volumes of rivalling Cincinnati, are constantly emitted, yet the London atmosphere is smoky while that of Paris is clear. In vast quantities of bituminous coal are consumed for domestic purposes, in Paris, none. We must therefore conclude the difference in the atmosphere of the two capitals is a difference in domestic conditions."

It is strange that in the discussion of the smoke the evils due to sulphurous acid should be so systematically neglected. No doubt the cry for the suppression of smoke is well enough in its way, but it resembles that no less than the sulphurous acid does the camel.

The *British Medical Journal* has undertaken the task of forming its readers "that smoke from factories or workshops is any kind no longer plagues London." The Augéan has been cleansed, we are informed, from the inferno afforded by the long and costly trials carried out in connection with the Smoke Abatement Exhibition, and through the agency of the Police and the Home Office, as well as the energetic action of the smoke inspector, London has been practically freed from factory smoke. All this no doubt very well, but what about the sulphurous acid, which well known to the authorities as to be exempted by mention in the 29th Section of the Alkali, &c., Works Regulation Act of 1881 : has there been any attempt to limit its evolution?

No doubt some of our correspondents will be asking the question—what do you propose, to limit the evils arising

An Improved Amalgamator—(Complete Specification). H. H. Lake. 8049.
May 22.
Recovery of Gold and Silver by means of Chlorine. W. H. Dowland.
8032. May 22.
Preparation of Cement. C. H. Skelsey. 8033. May 22.
Improved Electric Conductor. R. W. Edisson. 8036. May 23.
Smoke Consumption. J. Torkington. 8050. May 23.
Treating Phosphatic Minerals. R. Fullerton. 8064. May 23.
Hollow Furnace Fire Bars. J. B. Foxwell. 8067. May 23.
Manufacture of India-rubber Materials. T. Birnbaum. 8072. May 23.
Improved Composition of Soap—(Complete Specification). G. Allen. 8077.
May 23.
Secondary Batteries. M. Bailey and J. Warnes. 8086. May 23.
Packing Washer for Flange Joints. A. Scott. 8088. May 23.
Manufacture of Bleaching Powder and Caustic Soda—(Complete Specification). J. D. Penock and J. A. Bradburn. 8090. May 23.
Concrete. F. Sarg. 8108. May 23.
Manufacture of Gas. E. Freund. 8109. May 23.
Electric Meters. G. Forbes. 8110. May 23.
Brick-making Machinery. W. Rushforth. 8122. May 24.
Machinery for Dyeing, Scouring, and Drying Hanks. E. Sykes and D. Sykes. 8134. May 24.
Heating Fluids and Condensing Steam—(Complete Specification). J. Wright. 8145. May 24.
Improvements in Stills of the Coffey type. A. Chapman. 8147. May 24.
Treatment of Alkali Waste, and Manufacture of Sulphuretted Hydrogen and Sulphide of Ammonium. J. Leith. 8150. May 24.
Smoke Consumption and Fuel Economy. G. Moffatt and S. Stuttaford. 8167. May 24.
Apparatus for delivering Air into Boiler Furnaces. " "
8168. May 24.
Manufacture of Illuminating Gas. W. Clarke. 8170. May 24.

AT

Germany,	67 pk5.	H. Lambert
"	59	Petri Bros

Paraffin Wax—

U. S.,	200 brls.	L. & I. D. Jt. Co.
"	150	J. H. Usmar & Co.
"	35 cs. 590 brls.	H. Hill & Sons
"	200 brls.	Rose, Wilson & Rose
Holland,	180	H. Hill & Sons
"	110	H. Hill & Sons
"	1,718	J. H. Usmar & Co.
U. S.,	99	G. H. Trank
"	592 cs.	J. H. Usmar & Co.

Pitch—

France,	70 cks.	H. Hill & Sons
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Plumbago—

Germany,	40 cks.	Brown & Elmslie
E. Indies,	18 brls.	Doulton & Co.
"	87	Arbuthnot Latham & Co.
Germany,	19 cks.	H. Henle, Succrs.
E. Indies,	96 brls.	R. G. Hall & Co.
"	91	Price Hickman & Co.
"	19	Hoare, Wilson & Co.
Germany,	20 cks.	Pokorny Fielder & Co.
"	20	Le Sueur & Co.
"	19 brls.	Prop. C. Chamberlains Wf.
E. Indies,	128	J. Thedder, Son & Co.

Pyrites—

Spain,	400 t.	T. C. Hills & Co.
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Stearine—

France,	200 bgs.	G. Boor & Co.
Holland,	22 bls.	J. H. Usmar & Co.
Belgium,	25 bgs.	H. Hill & Sons
France,	60	"

Sodium Acetate—

France,	682	W. G. Blagden
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Sugar of Lead—

Holland,	2 pks.	Beresford & Co.
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Tar—

Germany,	200 brls.	Linck Moeller & Co.
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Tartaric Acid—

Holland,	4 pks.	Middleton & Co.
"	18	W. J. Crook
"	4	Northcott & Sons
"	8	Augsburg & Co.
"	2	B. & F. Wf. Co. Ltd.
France,	6	"

Ultramarine—

Belgium,	6 cks.	Leach & Co.
Holland,	20	Peron & Co.
Germany,	64 cs.	G. Steinhoff
Holland,	28 pks.	Haefner Hilpert & Co.
Belgium,	6	W. Harrison & Co.
"	5	Leach & Co.

Verdigris—

France,	2 pks.	C. Brumlen
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Zinc Oxide—

Holland,	50 brls.	M. Ashby, Ltd.
Germany,	50	"

LIVERPOOL.

Week ending May 27th.

Acetate of Lime—

St. Nazaire,	42 cks.	"
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Borax—

Leghorn,	30 cks.	Shropshire Union Ry. Co.
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Bones—

Bombay,	4 bgs.	"
Para,	10 t.	Gillies & Da Costa
Cadiz,	184 bgs.	8 brls. E. F. Callister & Co.

Bone Meal—

Bombay,	2,133 bgs.	"
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Chemicals (otherwise undescribed)

Rotterdam,	2 cks.	"
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Cream of Tartar—

Rotterdam,	4 cks.	"
Bordeaux,	7	"
Genoa,	18	"

Copper Ore—

New Orleans,	269 sks.	J. Lewis & Son
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Charcoal—

St. Nazaire,	640 sks.	"
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Caoutchouc—

Manaos,	9 cs.	Blagden & Prince
"	210	"
Itacoatiara,	6	"
Para,	6	Bieber & Co.
"	225	"
Boma,	1 brl.	Valle & Azevedo
Ambriz,	7	Taylor, Laughland & Co.
Mussera,	3	"
Kinsembo,	27	"
"	24	Samson & de Liagre

Caoutchouc—continued.

Ambrizette,	10	J. Holt & Co.
Muculla,	20	Taylor, Laughland & Co.
"	81	Samson & de Liagre
Banana,	13	Mender & Frinas
Cabenda,	57 bks.	Hatton & Cookson
Black Point,	6 cs	5 cks. Pinto, Leite & Co.
"	1 cks.	Edwards Bros.
Loango,	4	"
Sette Cama,	30	J. Holt & Co.
"	55	Hatton & Cookson
N'gove,	15	R. W. Roulston
Cape Lopez,	14	J. Holt & Co.
Gaboon,	21	A. V. Heyder
"	10	Daumais & Co.
Elobey,	8	J. Holt & Co.
Cameroons,	5	Rider, Sons & Co.
"	10	R. & W. King
"	14	J. Holt & Co.
"	5	Lucas Bros & Co.
"	13	A. Herschell
Victoria,	1 cs. 3 brls.	Ambois Bay Co.
Bibundi,	1 cks.	L. Hart & Co.
Old Calabar,	5	African Assen
"	1	"
"	2 cs.	Pickering & Berthoud

Dyestuffs—**Argols**

Oporto,	23 cks.	Ger. Bank, London
Brindisi,	51	271 sks.

Divi Divi

Hamburg,	213 bgs.	"
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Orchella

Hamburg,	3 bgs.	"
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Extracts

New York,	11 kgs.	A. J. White
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Marseilles,	126 brls.	"
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Antwerp,	7 cs.	J. T. Fletcher & Co.
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Philadelphia,	25 brls.	"
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Hamburg,	1 cs.	"
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Havre,	15 cks.	Cunard S.S. Co., Ltd.
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Fustic

Pernambuco,	2,490 kilos.	W. Blackburn
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Glycerine—

Amsterdam,	6 crbys.	6 cs.
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Marseilles,	2 brls.	H. Appleby
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Hamburg,	1 cs.	"
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Glucose—

Hamburg,	5 cks.	D. Currie & Co.
"	12	"
"	10	"

New York,	60 brls.	"
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Philadelphia,	218	"
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Horn Piths—

Para,	5 t.	Gillies & Da Costa
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Iodine—

Valparaiso,	120 brls.	A. Gibbs & Sons
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Manganese Ore—

Gothenburg,	80 t.	Masqueen Bros.
Batoum,	75 t.	"

Nitrate—

Valparaiso,	2 cs.	W. & J. Lockett
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Phosphates—

Antwerp,	1 pkg.	"
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"	2,350 bgs.	"
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Charleston,	2,000 t.	"
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Pitch—

Amsterdam,	14 cks.	"
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Pyrites—

Huelva,	1,390 t.	Matheson & Co.
"	1,430	"
"	2,557	"
"	2,058	"

Potash—

Rotterdam,	30 cks.	"
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Saltpetre—

Calcutta,	1,789 bgs.	"
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Hamburg,	41 cks.	"
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Sulphur Ore—

Huelva,	1,441 t.	Matheson & Co.
"	1,600	"

Sodium Silicate—

Rotterdam,	1 ck.	"
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Stearine—

Antwerp,	12 bgs.	J. T. Fletcher & Co.
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Tartar—

Bordeaux,	5 cks.	"
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Tartaric Acid—

Marseilles,	3 brls.	"
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Ultramarine—

Rotterdam,	22 cks.	13 cs.
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Verdigris—

Marseilles,	6 brls.	"
Bordeaux,	5 cks.	"

Waste Salt—

Hamburg,	607 bgs.	130 t. D. Currie & Co.
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Zinc Oxide—

Antwerp,	175 brls.	"
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GLASGOW.

Week ending May 29th.

Aluminium—

Antwerp,	15 cs.	"
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Barytes—

Antwerp,	200 bgs.	"
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Carbonic Acid—

Rotterdam,	12 cks.	J. Rankine & Son
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Cream of Tartar—

Bombay,	10 cks.	"
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Dyestuffs—**Alizarine**

Rotterdam,	9 cks.	J. Rankine & Son
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Extracts

Rouen,	40 cs.	5 cks.
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Antwerp,	5 cks.	"
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"	3	4 pks.
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Rouen,	12	"
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"	60 bgs.	"
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Sumac

Bombay,	150 bgs.	"
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Logwood

Jamaica,	492 t.	W. Connal & Co.
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Madders

Rotterdam,	2 cks.	"
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Phosphate Rock

Charlestown,	1,050 t.	A. Cross & Sons
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Pitch—

Antwerp,	17 cks.	"
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Stearine—

Antwerp,	63 bgs.	"
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Sodium Silicate—

Rotterdam,	2 cks.	"
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Tartaric Acid—

Bombay,	21 brls.	"
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Tartar—

Bordeaux,	9 cks.	J. & P. Hutchinson
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Ultramarine—

Rotterdam,	5 cks.	J. Rankine & Son
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Zinc Oxide—

Antwerp,	11 cks.	"
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TYNE.

Week ending May 27th.

Copper Precipitate—

Huelva,	2,198 bgs.	Scott Bros.
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Pomaron,	3,454	Mason & Barry
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Pyrites—

Huelva,	1,296 t.	Scott Bros.
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Rock Salt—

Hamburg,	155 t.	"
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Sulphur Ore—

Pomaron,	1,045 t.	Mason & Barry
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Saltpetre—

Hamburg,	10 cks.	Tyne S. S. Co.
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Ultramarine—

Rotterdam,	10 cs.	Tyne S. S. Co.
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Zinc Oxide—

Antwerp,	55 brls.	Tyne S. S. Co.
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HULL.

Week ending May 29th.

Alum—

Hamburg,	24 cks.	Bailey & Leatham
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Albumen—

St. Petersburg,	70 cs.	"
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Acids (otherwise undescribed)

Rotterdam,	18 cks.	G. Lawson & Sons
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Bone Meal—

Bombay,	638 bgs.	"
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Barytes—

Antwerp,	63 cks.	H. F. Pudsey
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"	38	A. Sanderson & Co.
---	----	--------------------

"	5	Bailey & Leatham
---	---	------------------

"	49	H. F. Pudsey
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Carbonic Acid—

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.			Hydro Carbon—			Bleaching Powder—			Caustic Soda—continued.		
<i>Week ending May 21st.</i>			Brussels, 2 t.	2 c.	£38	Ancona, 14 cks.			Bilbao, 31 dms.		
Ammonia—			Manure—			Baltimore, 107			Bombay, 10		
Santos, 12 c.	£20		Riga, 99 t.	10 c.	£347	Bordeaux, 10			Boston, 800		
Ammonium Sulphate—			St. Vincent, 10		101	Boston, 401			Cartagena, 5		
Barbaños, 100 t.	£1,180		Martinique, 303	6	2,310	Calcutta, 203	81 cs.		Cienfuegos, 20		
Sydney, 25 2 c.	307		Cherbourg, 30		526	Genoa, 203			Dunedin, 10		
Cologne, 19	220		Sydney, 19		135	Ghent, 23			Dunkirk, 36		
Ammonium Carbonate—			Riga, 97		300	Hamburg, 103			Nagasaki, 50		
Paris, 3 t. 14 c.	£111		Nitric Acid—			Havana, 103			Nantes, 15		
Bordeaux, 1 14	50		Montreal, 10 cs.		£22	Hong Kong, 103	21 brls.		Naples, 105		
Ammonium Muriate—			Phosphorus—			Leghorn, 8			New Orleans, 200 kgs.		
Sydney, 11 c.	£14		Dunedin, 1,100 lbs		£33	Montreal, 7	13 pks.		Oporto, 15		
Arsenic—			Potassium Bromide—			New York, 356			Otago, 3		
Sydney, 1 t.	£15		Sydney, 3 kgs.		£23	Oporto, 52			Palermo, 5		
Boric Acid—			Potash—			Philadelphia, 57			Penang, 90		
Melbourne, 20 pks.	£56		Sydney, 5 c.		£22	San Sebastian, 17			Philadelphia, 140	84 brls.	
" 1 t. 2 c.	43		Potassium Permanganate—			Trieste, 27			Rotterdam, 34		
Brimstone—			Melbourne, 5 c.		£13	Vera Cruz, 27			St. John, N.B., 20		
Algoa Bay, 2 t. 1 c.	£16		Potassium Chlorate—			Antwerp, 11			St. Louis, 100	15 15 bks.	
Carbolic Solid—			Melbourne, 5 c.		£13	Bilbao, 25			San Sebastian, 130		
Paris, 1 t. 3 c.	£77		Saltetre—			Boston, 855			Fairwater, 70		
Copper Sulphate—			Santos, 4 t. 13 c.		£110	Bruges, 25			Fiume, 15		
Genoa, 5 t. 5 c.	£120		Oporto, 3 14		77	B. Ayres, 27	33		Galatz, 90		
Calcutta, 10	248		Vigo, 1 10		32	Chicago, 27			Gefse, 5		
Genoa, 5	110		Rio de Janeiro, 1 9		33	Genoa, 175			Hamburg, 3		
Bordeaux, 10	220		Santos, 4 9		100	Ghent, 130			Ilirail, 133		
" 20	475		Sodium Bicarbonate—			Halifax, 104	2 cs.		Kurrachee, 20		
Cream of Tartar—			Nelson, 2 t.		£15	Hamburg, 104	83		Leghorn, 35		
Nelson, 10 c.	£59		Sodium Sulphate—			Naples, 21			Malta, 5		
Brisbane, 1 t. 10	100		Sydney, 3 t. 4 c.		£11	New York, 184			Marseilles, 48		
Melbourne, 10	55		Sulphur—			Rotterdam, 111			Melbourne, 144		
" 1 107	60		Lisbon, 200 brls.		£154	San Francisco, 44	96		Messina, 15		
Lyttleton, 10	60		Algoa Bay, 150 kgs.		60	Venice, 18			Monte Video, 180		
Newcastle, 3 cs.	17		Saltcake—			Borate of Lime—			Montreal, 218		
Citric Acid—			Hamburg, 127 t. 5 c.		£178	Rotterdam, 10 t.	3 q. £120		Stax, 10		
Melbourne, 20 kgs.	£140		Sheep Dip—			Borate of Lime—			Stettin, 65	10 cks.	
Toronto, 20	140		Algoa Bay, 25 cs.		£77	Havre, 20 c. 10 c.	1 q. £358		Stockholm, 15		
Halifax, 2 c.	14		" 50		140				Trieste, 25		
Rangoon, 2 cs.	5		New York, 13 t. 8 c.		975	Borax—			Vigo, 15		
Antwerp, 2 kgs.	15		Algoa Bay, 5 16		300	Montreal, 2 t. 5 c.	£68		Citric Acid—		
Hamburg, 3 c.	21		Wellington, 200 drs.		119	Rotterdam, 5 4	145		Rangoon, 1 cs.	£3	
Calcutta, 1/2	2		Sheep Wash—			Brimstone—			Giljon, 2 c.	£90	
Nelson, 1	10		B. Ayres, 100 drms.		£140	Boston, 35	£150		Seville, 2 q.	30	
Barcelona, 1 t.	143		Sulphuric Acid—			New York, 50	210		Chalk Precipitate—		
Hamburg, 4 cks.	59		Rangoon, 3 t. 15 c.		£39	Caustic Soda—			New York, 2 t. 10 c.	3 q. £60	
Brussels, 6 kgs.	43		Singapore, 1		13	Pernambuco, 59 dms.			Carbolic Solid—		
Clarifiants—			Trinidad, 3 5		12	Philadelphia, 2	30 cks.		Rouen, 6 c.	£50	
Bordeaux, 45 cks.	£67		Superphosphate—			St. John, N.B., 50			Cream of Tartar—		
Caustic Soda—			Martinique, 138 t.		£552	San Francisco, 75	10 brls.		Gibraltar, 2 c.	£12	
Batoum, 10 t. 3 c.	£100		Tartaric Acid—			Santander, 2			Copperas—		
Caustic Potash—			Nelson, 5 c.		£40	Santos, 20			Constantinople, 7 t. 11 c.	£15	
Melbourne, 1 t.	£26		Lyttleton, 5		39	Savanilla, 20	50 kgs.		Calcutta, 13 15	20	
Chemicals (otherwise undescribed)			Newcastle, 2 cs.		11	Shanghai, 4			Smyrna, 7 7 3	15	
Adelaide, 100 cs.	£120		Halifax, 3 1/2 c.		£24	Singapore, 11			Soerabaya, 20 5	57	
Karrachi, 12	35		Melbourne, 5		38	Talavera, 30			Rotterdam, 19 17 2	47	
Sydney, 5	145					Tarragona, 112	20 cks.		Caustic Potash—		
Barcelona, 7	50					Tunis, 10			Boston, 1 t. 15 c.	£35	
						Valencia, 55			New York, 8 13	173	
						Valencia, 55			Copper Sulphate—		
						Viola, 2			Cape Town, 4 c.	£6	
						Leghorn, 60			Barcelona, 10 t. 1	1 q. 157	
						Macao, 30			Bordeaux, 56 16	3 1,149	
						Malrid, 70			" 4 14	99	
						Malaga, 190 pks.			" 133 19	3,448	
						Malta, 35 dms.			Genoa, 34 3	643	
						Melbourne, 30			Naples, 4 18	89	
						Messina, 25			Trieste, 2	1 37	
						Montreal, 100			Rouen, 51 8	1,200	
						Nagasaki, 200			Hamburg, 3 7 3	8	
						Nantes, 69			Algiers, 9 3	8	
						Naples, 28			Alicante, 2 3	40	
						New York, 1,355			Bilbao, 15 2	3 310	
						Odessa, 300			Bordeaux, 148 15	1 1,513	
						Passages, 55			Marseilles, 110 17	3 2,719	
						Adelaide, 35			Naples, 3 10	64	
						Alicante, 50			Leghorn, 2 2	34	
						Amsterdam, 20			Genoa, 37 2	2 355	
						Bahia, 15	50 kgs.		Nantes, 35 2	2 2,125	
						Barcelona, 120			Naples, 4 19	3 100	
						Bari, 51			Pernambuco, 10 10	14	
						Batoum, 161			Venice, 3 18	3 80	
						Boston, 150			Algiers, 10 2	2 230	
						Bremen, 2			Almeria, 5 1	66	
						Cienfuegos, 20			Genoa, 50 11	1,152	
						Genoa, 183			Iquique, 11 1	226	
						Gothenburg, 176			Valparaiso, 3 12	86	
						Guantanamo, 10			Passages, 4 19	2 120	
						Hamburg, 54			Tarragona, 15	265	
						Algiers, 35			Carbolic Acid—		
						Ancona, 30			Havre, 4 t. 1 c.	£41	
						Antwerp, 74			New York, 2 13	150	
						Bahia, 15			Rotterdam, 59 8	7,227	
						Baltimore, 50			Hamburg, 4	460	
						Bari, 17					
						Batoum, 222					

Carbolic Acid—continued.

Kurrachee, 1 t.	17 c.	£14
Paris, 2	5	19
Philadelphia, 11	9	3
Genoa, 1		105

Chemicals (otherwise undescribed)

Puerto Cabello, 1 cs.		£6
Trinidad, 75		230

Disinfectants—

Demerara, 1 t.		£18
Calcutta, 14 pks.		5

Dried Blood—

Montreal, 2 t.	1 c.	1 q.	£25
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Epsom Salts—

Calcutta, 10 cks.			
Genoa, 6			
Yokohama, 20 brls.			

Glycerine—

Vera Cruz, 1 c.			£5
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Guano—

Havana, 246 t.	1 c.	2 q.	£2,140
Valencia, 298	19	1	2,987

Gypsum—

New York, 10 t.		3 q.	£30
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Magnesia—

Talcahuano, 2 kgs			
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Magnesium Chlorate—

Singapore, 10 c.			£6
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Manure—

Demerara, 134 t.	13 c.		£1,470
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Oxalic Acid—

Barcelona, 5 t.	13 c.		£142
New York, 3		2 q.	112

Potassium Sulphate—

Barbadoes, 20 t.	4 c.	3 q.	£155
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Pieric Acid—

New York, 15 c.			£150
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Potassium Bichromate—

Santos, 6 brls.			£40
Smyrna, 13 c.			25
Aleppo, 7			13

Pitch—

Antwerp, 304 t.		166 cks.	
Catania, 970			
Marseilles, 70		18 c.	
Rouen, 60			

Potassium Carbonate—

Boston, 12 t.	5 c.		£186
New York, 3	14		50

Potashes—

Catania, 5 t.	17 c.		£127
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Potassium Prussiate—

Rio de Janeiro, 1 cs.			£9
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Potassium Chlorate—

Shanghai, 1 t.	10 c.		£77
Genoa, 1			43
Rotterdam, 1			42
New York, 2	10		128
Genoa, 1	5		65
Naples, 2	6		140
New York, 2	10		130
Odessa, 1			25
Carril, 1			48
Stockholm, 8			364
Santander, 1			42
Santos, 93			310
Gothenburg, 7			

Sulphur Chloride—

Barcelona, 2 c.			£6
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Sodium Bichromate—

Rotterdam, 12 t.	2 c.		£17
Yokohama, 3	11	2 q.	£107

Salt—

Benin, 45 t.			
Bergen, 540			
Bilbao, 2½			
B. Ayres, 40			
Calcutta, 7,630			
Chicago, 100			
Degama, 50			
Dunedin, 10			
E. London, 22			
Fredericia, 725			
Halifax, 25			
Isles de Los, 25			
Melbourne, 85			
Montreal, 815			
Opobo, 100			
Algoa Bay, 6			
Barbadoes, 20			
Cape Town, 10			
Dunedin, 30			
Halifax, 883			
Montreal, 210			
Pugwash, 50			
Quebec, 600			
Shediac, 390			
Para, 178½			
Portland, 1,048½			
St. John's, Nfld., 5			
Stockholm, 150			
Valparaiso, 4½			
Victoria, 175			

Soda Ash—

Baltimore, 140 tcs.	415 cks.		
Bombay, 2			
Boca, 41 brls.			
Boston, 74	46	850 bgs.	
B. Ayres, 200 brls.			
Cape Town, 20			
Constantinople, 10			
Galatz, 42			
Hong Kong, 12			
Melbourne, 22½			
Para, 8			
Paranagua, 18			
Philadelphia, 598	210		
Rio Janeiro, 67			
Seville, 7			
Sherbrooke, 18	45		
Varna, 20			
Alicante, 30			
Baltimore, 162	70		
Boston, 134	191	900 bgs.	
Corunna, 2			
Ghent, 42			
Monte Video, 100 brls.			
New Orleans, 7			
New York, 598	856		
Philadelphia, 43			
Piraeus, 100			
Puerto Cabello, 2			
Santos, 230			
Valparaiso, 5	10		

Sodium Bicarbonate—

Antwerp, 19 cks.			
Bilbao, 30 kgs			
B. Ayres, 25		800	
Calcutta, 20			
Hamburg, 20			
Mantanzas, 20			
Monte Video, 200			
Montreal, 350			
Naples, 22			
Rio Janeiro, 50			
Seville, 14 brls.	50		
Toronto, 20			
Trieste, 115			
Antwerp, 29	60	50 bgs.	
Bombay, 250			
Constantinople, 50			
Gutujewsky, 100			
Hamburg, 20			
Las Palmas, 40			
Melbourne, 50			
Newfairwater, 20			
Quebec, 50			

Soda Crystals—

Boston, 280 brls.			
Constantinople, 50			
Iquique, 100 kgs.			
Monte Video, 30 cks.	25 brls.		
New York, 190			
Boston, 140			
Constantinople, 50			
Malta, 200			
Pernambuco, 100			
Shanghai, 16			

Sodium Silicate—

Cienfuegos, 8 brls.			
Bilbao, 58			
Genoa, 150			

Sulphuric Acid—

Vera Cruz, 4 c.	1 q.	£5
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Sodium Nitrate—

New York, 16 c.	3 q.	£22
Demerara, 20	15	187

Sodium Chlorate—

Lisbon, 5 c.		£14
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Saltcake—

Baltimore, 60 t.	9 c.	£106
Montreal, 100	11	251

Sulphur—

Rouen, 30 t.	4 c.	£136
Rangoon, 2		9
Ceara, 16		3
St. John, N.B., 15		19
New York, 100	4	1,124
Boston, 70	2	350

Saltpetre—

Geara, 8 c.		£9
Maceio, 15		17
Pernambuco, 1 t.	10	40

Salammoniac—

Calcutta, 15 c.		£27
Galatz, 9		16
Genoa, 17	3 q.	31
Antwerp, 4		6
Trieste, 4	2	36
Smyrna, 2 t.	8	83
Antwerp, 19	2	38
Philadelphia, 7	15	272
Alexandria, 19		34
Montreal, 1	1	36
Pernambuco, 2	10	65
Galatz, 11	3	19

GLASGOW.

Week ending May 29th.

Alumina Sulphate—

Melbourne, 215 c.		£34. 10s.
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Ammonium Sulphate—

Trinidad, 221 t.	¾ c.	£2734
Demerara, 67	6¾	770
"	34	385

Benzole—

Rotterdam, 125 brls.	63 drms.	£1945
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Bleaching Powder—

Calcutta, 100 c.		£30
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Charcoal—

Rotterdam, 5 t.	4 c.	£17
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Chemicals (otherwise undescribed)

Quebec, 9 t.	10¼ c.	£95
Chili, 11½ c.		£36

Dyestuffs—

Extractions, 22½ c.		£48
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Epsom Salts—

Quebec, 131 c		£24
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Lead Nitrate—

Montreal, 2 t.	2 c.	£40
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Manure—

Trinidad, 309 t.	14 c.	£2,279
"	318	17½
"	10	2,543
"		113

Paraffin Wax—

Melbourne, 238 c.		£361
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Potassium Bichromate—

Stockholm, 13 cks		£135
Melbourne, 22 c.		40
Calcutta, 11½		20

Potassium Prussiate—

New York, 117 c.		£475
Antwerp, 407½		591

Pitch—

Amsterdam, 150 t.		£78. 15s.
Madras, 58 t.	10 c.	£29
Quebec, 58 t.		102

Tar—

Madras, 58 t.		£31
Calcutta, 58 t.		£56. 10s.

TYNE.

Week ending May 27th.

Antimony—

Hamburg, 3 t.		
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Alkali—

Hamburg, 3 t.	11 c.	
Christiania, 12		
St. Petersburg, 29	19	
Montreal, 25	5	

Alumina Sulphate—

Montreal, 5 t.	6 c.	
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Barytes Carbonate—

Genoa, 10 c.		
Hamburg, 6 t.		

Bleaching Powder—

Hamburg, 20 t.	19 c.	
Gothenburg, 10	4	
Antwerp, 33	19	
Montreal, 12	16	
St. Petersburg, 238 t.	18 c.	
Christiania, 30		

Lisbon, 10 t.

Venice, 3	13 c.	
Naples, 2	14	
Oporto, 10	2	
Flensburg, 16	15	
Montreal, 15		

Copperas—

Sundsvall, 14 t.	3 c.	
Fredericia, 5	11	
Montreal, 7	14	

Caustic Soda—

Genoa, 42 t.	14 c.	
Flensburg, 7	5	
Montreal, 7	10	
Gothenburg, 4	18	
Hamburg, 8	19	
Antwerp, 1	14	
Montreal, 7	5	

Litharge—

Hamburg, 3 t.	19 c.	
Montreal, 5	10	

Magnesia—

Hamburg, 2 c.		
Antwerp, 1		
Montreal, 3 t.		

Pitch—

Antwerp, 100 t.		
Montreal, 2 c.		

Potassium Chlorate—

St. Petersburg, 5 t.		
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Sodium Sulphate—

Aarhus, 10 t.	10 c.	
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Sodium Silicate—

PRICES CURRENT.

WEDNESDAY, JUNE 4, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt.	7/-	&	12/6
„ Glacial	„	65/-		
Arsenic, S.G., 2000°	„	0	12	9
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	„	0	0	3¼
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
„ (Cylinder), 30° Tw.	„	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	„	0	0	1¼
Oxalic	nett	0	0	3¼
Picric	„	0	1	1½
Sulphuric (fuming 50 %	per ton	15	10	0
„ (monohydrate)	„	5	10	0
„ (Pyrites, 168°)	„	3	2	6
„ (free from arsenic, 140/145°)	„	1	4	6
Sulphurous (solution)	„	2	15	0
Tannic (pure)	per lb.	0	1	0½
Tartaric	„	0	1	3
Arsenic, white powdered	per ton	13	0	0
Alum (loose lump)	„	4	17	6
Alumina Sulphate (pure)	„	5	0	0
„ (medium qualities)	„	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 880=28°	per lb.	0	0	3
„ =24°	„	0	0	1¼
„ Carbonate	nett	0	0	3½
„ Muriate	per ton	23	0	0
„ (sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
„ Nitrate	per ton	40	0	0
„ Phosphate	per lb.	0	0	10½
„ Sulphate (grey), London	per ton	11	6	3
„ (grey), Hull	„	11	5	0
Aniline Oil (pure)	per lb.	0	0	10½
Aniline Salt	„	0	0	9
Antimony	per ton	75	0	0
„ (tartar emetic)	per lb.	0	1	1
„ (golden sulphide)	„	0	0	10
Barium Chloride	per ton	8	5	0
„ Carbonate (native)	„	3	12	6
„ Sulphate (native levigated)	„	45/-	to	75/-
Bleaching Powder, 35 %	„	4	17	6
„ Liquor, 7 %	„	2	10	0
Bisulphide of Carbon	„	13	0	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	2	6
China Clay (at Runcorn) in bulk	„	17/6	to	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	„	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	5
Benzol, 90 % nominal	per gallon	0	3	9
„ 50/90	„	0	2	9
Carbolic Acid (crystallised 35°)	per lb.	0	0	8
„ (crude 60°)	per gallon	0	2	2
Creosote (ordinary)	„	0	0	2½
„ (filtered for Lucigen light)	„	0	0	3
Crude Naphtha 30 % @ 120° C.	„	0	1	4
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	„	1	8	0
Solvent Naphtha, 90 % at 160°	per gallon	0	1	9
Coke-oven Oils (crude)	„	0	0	2½
Copper (Chili Bars)	per ton	54	10	0
„ Sulphate	„	25	0	0
„ Oxide (copper scales)	„	55	0	0
Glycerine (crude)	„	30	0	0
„ (distilled S.G. 1250°)	„	60	0	0
Iodine	nett, per oz.	0	0	9
Iron Sulphate (copperas)	per ton	1	10	0
„ Sulphide (antimony slag)	„	2	0	0
Lead (sheet) for cash	„	14	0	0
„ Litharge Flake (ex ship)	„	15	10	0
„ Acetate (white „)	„	24	0	0
„ „ (brown „)	„	18	0	0
„ Carbonate (white lead) pure	„	19	0	0
„ Nitrate	„	22	0	0
Lime, Acetate (brown)	„	7	12	6
„ „ (grey)	per ton	13	5	0
Magnesium (ribbon and wire)	per oz.	0	2	3
„ Chloride (ex ship)	per ton	2	5	0
„ Carbonate	per cwt.	1	17	6
„ Hydrate	„	0	10	0
„ Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	„	17	10	0
„ Borate (1st and 2nd)	per cwt.	60/-	&	42/6
„ Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	„	0	3	11
„ Miscible, 60° O.P.	„	0	4	7
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	„	26	0	0
Lubricating, Scotch, 890°—895°	„	7	5	0
Petroleum, Russian	per gallon	0	0	5½
„ American	„	0	0	5½
Potassium (metal)	per oz.	0	3	10
„ Bichromate	per lb.	0	0	4
„ Carbonate, 90% (ex ship)	per ton	19	10	0
„ Chlorate	per lb.	0	0	4½
„ Cyanide, 98%	„	0	2	0
„ Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
„ „ (Caustic Potash) 75/80 %	„	21	10	0
„ „ (Caustic Potash) 70/75 %	„	20	15	0
„ Nitrate (refined)	per cwt.	1	2	0
„ Permanganate	„	4	2	0
„ Prussiate Yellow	per lb.	0	0	9½
„ Sulphate, 90 %	per ton	9	10	0
„ Muriate, 80 %	„	7	15	0
Silver (metal)	per oz.	0	3	10½
„ Nitrate	„	0	2	7
Sodium (metal)	per lb.	0	4	0
„ Carb. (refined Soda-ash) 48 %	per ton	6	5	0
„ „ (Caustic Soda-ash) 48 %	„	5	5	0
„ „ (Carb. Soda-ash) 48 %	„	5	12	6
„ „ (Carb. Soda-ash) 58 %	„	6	15	0
„ „ (Soda Crystals)	„	2	17	6
„ Acetate (ex-ship)	„	16	0	0
„ Arseniate, 45 %	„	11	0	0
„ Chlorate	per lb.	0	0	6½
„ Borate (Borax)	nett, per ton	29	0	0
„ Bichromate	per lb.	0	0	1
„ Hydrate (77 % Caustic Soda) (f.o.b.)	per ton	9	15	0
„ „ (74 % Caustic Soda)	„	0	0	0
„ „ (70 % Caustic Soda)	„	8	5	0
„ „ (60 % Caustic Soda, white) (f.o.b.)	„	7	5	0
„ „ (60 % Caustic Soda, cream)	„	7	2	6
„ Bicarbonate	„	5	15	0
„ Hyposulphite	„	5	10	0
„ Manganate, 25 %	„	9	0	0
„ Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	0
„ Nitrite, 98 %	per ton	28	0	0
„ Phosphate	„	15	15	0
„ Prussiate	per lb.	0	0	7½
„ Silicate (glass)	per ton	5	7	0
„ „ (liquid, 100° Tw.)	„	3	17	6
„ Stannate, 40 %	per cwt.	2	0	0
„ Sulphate (Salt-cake)	per ton	1	6	6
„ „ (Glauber's Salts)	„	1	10	0
„ Sulphide	„	7	15	0
„ Sulphite	„	5	5	0
Strontium Hydrate, 98 %	„	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	7½
„ Barium, 95 %	„	0	0	5½
„ Potassium	„	0	0	8
Sulphur (Flowers)	per ton	7	10	0
„ (Roll Brimstone)	„	6	0	0
„ Brimstone: Best Quality	„	4	7	6
Superphosphate of Lime (26 %)	„	2	12	6
Tallow	„	25	10	0
Tin (English Ingots)	„	98	0	0
„ Crystals	per lb.	0	0	6¼
Zinc (Spelter)	per ton	23	0	0
„ Chloride (solution, 96° Tw.	„	0	0	0

THE CHEMICAL TRADE JOURNAL

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No. 160.

SATURDAY, JUNE 14, 1890.

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Notices.

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LATE ADVERTISEMENTS.

NEW TENDER.

TAR AND AMMONIA LIQUOR

THE Penrith Local Board are prepared to receive TENDERS for the PURCHASE of the SURPLUS TAR and AMMONIACAL LIQUOR produced at their works during the year ending June 30th, 1891.

Full particulars may be obtained on application to Mr. E. Shaul, Gas Manager. Sealed tenders endorsed "Tender for Tar, &c.," to be delivered to the undersigned not later than Monday, June 30th, 1890.

Public Offices,
June 12th, 1890.

G. WAINWRIGHT,
Clerk to Local Board,
Penrith.

TIPTON GAS WORKS.

TAR CONTRACT.

THE Gas Committee of the Tipton Local Board invite TENDERS for the purchase of the surplus TAR produced at the above Works, during a period of one, two, or three years, from the 1st of July next. Particulars may be obtained at the Gas Works on application to the undersigned. The Tar may be delivered either into Boats or on Rail, L. and N. W. R., as may be required.

Sealed and endorsed tenders to be sent to Mr. G. M. Waring, Clerk to the Board on or before the 21st of June.

The Committee do not bind themselves to accept the highest or any tender.

By order,
Gas Offices,
Tipton, June 6, 1890.

VINCENT HUGHES,
Engineer and Manager.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates:—

30 Words and under..... 2s. 0d. per insertion.

Each additional 10 words..... 0s. 6d. "

Advertisements of Situations Wanted are inserted at one-half the above rates when prepaid, viz:—

30 Words and under..... 1s. 0d. per insertion.

Each additional 10 words..... 0s. 3d. "

Trade Advertisements, Announcements in the Directory Columns, and all Advertisements not prepaid are charged at the Tariff rates, which will be forwarded on application.

THE LAW OF PATENTS.—SUGGESTIVE AMENDMENTS.

THE Chemical and Allied Trades Section of the Manchester Chamber of Commerce has for some time had under consideration the bearing and application of the Patents, Designs, and Marks Acts of 1883-88.

The Committee of the Section has arrived at the conclusion that certain provisions of the Patent Act of 1883 are mischievous and impracticable when applied to chemical patents. The Committee is also of the unanimous opinion that some provision ought to be made in the law for distinguishing between mechanical and chemical patents for the reason that however applicable the existing statutes may be to the former, it frequently happens that its provisions are absolutely impracticable when they come to be applied to the latter.

This fact has already been fully recognised in the German Law by the enactment of special clauses and provisions for the administration of the law in the case of chemical patents. The Committee is further of opinion that if the principle were adopted of distinguishing between mechanical and chemical patents, the ability of litigation in the case of chemical patents would be considerably decreased, and greater justice would be done to litigants.

For the present the attention of the committee has been directed to the anomalies which result from the operation of Section 18, for future deliberation other sections and provisions of the Patent Act of 1883 to 1888. This section gives power to a patentee from time to time to disclaim, correct, or explain his specification. There is practically no safeguard for the public against the far-reaching thus granted. It is true that the second clause of this section gives any person the right to oppose an application for leave to amend, but also that the eighth clause apparently limits the rights granted to the applicant by Clause 1; but, in fact, both these protective clauses altogether ineffectual to prevent unscrupulous patentees from abusing both the letter and spirit of the law.

According to the existing law a patentee invalidates his patent amongst other reasons:—

1. If he describes in his specification a process that does not produce the result claimed.
2. If he specifies one or more alternative processes for obtaining similar or equivalent results, and one of those processes does not produce the result claimed.
3. If, in his specification, he uses ambiguous, misleading, or evasive language.
4. If his description is insufficient to enable those skilled in the art to carry out the invention without other aid than is afforded by the specification.

The Committee holds that these just and equitable principles have been made absolutely inoperative by the application and effect of Section 18, and that a patentee may now commit breaches of the principles first set forth, and may abuse a monopoly and profit therefrom, which, in their opinion, is already far too easily granted to him without running the slightest risk of vitiating his patent, because he can confidently trust to his benevolent friend, Section 18, to afford him with all the protection of which he may stand in need, and thus enable him to make good a patent, to the possession of which he was never entitled.

A patentee may now specify and claim almost anything that his speculative and imaginative mind may suggest, without ever having made a single experiment to ascertain the possibility of the realisation of his claim.

dreams, so long as he is clever enough to make his original specification sufficiently wide and comprehensive, and to formulate it in a manner as to permit him, in accordance with Section 18, from time to time, to disclaim, correct or explain, without in any way enlarging his claims, or, after such amendment, making the invention substantially different from or larger than the original specification. Pursued by section 18, the speculative faculties of some patentees of late years have been so marvellously extended, that it now frequently happens that a patentee specifies, and claims as part of his invention, chemical products or substances which he has never even seen, much made or produced.

It may, therefore, well be asked, what are the consequences of such anomalous state of things, in which we have, on the one hand, an established law and practice, tending to prevent the abuse of a privilege, and on the other, laws to make their operation ineffective. An illustration will, perhaps, serve to bring more clearly before the mind the ground on which these assertions are made, and the manner in which advantage may be and is taken by patentees of the provisions of section 18.

A would-be patentee, for example, gets the idea into his head that a valuable combination of aniline with naphthol might produce a new coloring matter, and on trying this in the laboratory he really obtains a new coloring reaction. Here, then, is the foundation for a patent, which might be applied for without loss of time, before anybody gets a similar idea.

His chemical knowledge will suggest to him that aniline belongs to a class known to chemists as "amines," that there exist a number of bodies belonging to this class, and that naphthol belongs to a group of chemicals known as "phenols," also including a large number of other bodies, and further, that these amines and phenols, again combined separately with other substances. The idea further occurs to him that all these amines and phenols, and their complex resultant bodies, when also, when combined, probably produce similar, or even much more valuable coloring matters than the simple combination of aniline and naphthol. Now here is a dilemma: for his chemical knowledge tells him at the same time that although it is probable that all these combinations might produce coloring matters similar to the one he has hastily detected when combining aniline with naphthol, yet, the probability is by no means excluded that some of these might not produce such results.

We will stop here for a moment to review the position. The recognised principles of law would, under these conditions, only permit him to specify that which he has really discovered and ascertained by experiment to give a certain result, which would be the combination of aniline with naphthol; and if he did specify and claim more than he had discovered, and it should turn out afterwards that one or several of the combinations will not work or give the specified result, then his patent would be null and void, and rightly so, for his patent has really and actually been taken out under false pretences.

But, to follow up the illustration, the would-be patentee sets the law aside by relying on section 18 to get him out of his difficulties if it should happen to go against him, and it should ultimately turn out that some of these combinations either give practically no result, or a result different from the result claimed. He proceeds, after a very brief consideration, and without wasting any more time in experiments, to draw up his specification somewhat in the following manner:— "I have discovered that new and valuable coloring matters, from white to reds, may be produced by first converting amines, such as aniline and its homologues and their sulpho-acids, into their respective diazo compounds, and combining these diazo compounds, in a manner well known to chemists, with phenols, their sulpho and carboxylic acids, &c., &c." Then follows the example with aniline and naphthol, in order to show the manner or process of practically carrying out his invention.

Here we have a high-sounding and truly comprehensive patent for an ingeniously-speculative would-be patentee. From a coloring matter produced by the combination of two chemicals, our inventor has increased his invention to several hundred combinations. But the worst of it is that this patent is absolutely good, and he will not only have a monopoly for 14 years, and put a tax on our industries, but he will also prevent other inventors from labouring in a special field of research which he has wrongfully claimed as belonging to him, and will add anyone by laborious experiment discover amidst this labyrinth of probabilities anything really valuable and useful, he will soon find a ready-made patent put to his inquisitive curiosity. Our patentee, however, well aware that to take action successfully means that he must have a good case which will stand the scrutinising tests of the Courts, and he has his time about found out that some of his patented combinations are excellent in theory but would not work in practice. What must he then do? He simply applies to the Comptroller for an amendment to his patent under section 18, explaining that in the practical working of his processes he has found that some of his results as claimed are not so useful as others, and that he is anxious to give the public the benefit of his later experience. He then commences to apply the pruning knife to his patent, always conforming to clause 8, and without enlarging his patent

he complies with it by narrowing down his claims by disclaimer; he strikes out the useless matters, corrects and explains away that which was false and misleading, until of a copious specification apparently only the mere skeleton is left.

But this change has converted a legally-valueless patent into a valuable one, and by virtue of clause 9, which provides that the amendment shall in all courts and for all purposes be deemed to form part of the specification, he is now safe against all opposition and interference on the part of the public. Surely the Comptroller cannot object to our patentee disclaiming, for instance, toluidin and xyldin and naphthylamine, which are amines, and disclaiming, for example, phenol, cresol, resorcinol, or other phenols, their sulpho and carboxylic acids, etc., because by so doing he actually narrows down his claim. In the eyes of the Comptroller, with the limited powers with which he is invested, the applicant has in every respect complied with the provisions of section 8, because the invention has not been enlarged or rendered substantially different. The invention and claims were for coloring matters obtained by combining amines and their sulpho-acids with phenols and their sulpho and carboxylic acids, and it will remain such after the amendment has been granted.

By the foregoing illustration, which might be multiplied almost *ad infinitum*, it has been attempted to show the manner in which great facilities are afforded by section 18 to unscrupulous patentees for evading the law, and the Committee trust they have succeeded in establishing the conviction that this section in its present form operates hurtfully and injuriously on our trades and industries. They now submit their propositions for preventing this abuse of privilege, without doing any injustice or restricting in any way the rights of honest inventors. These proposals are:—

1.—To add to part II., section 5, sub-section 4, of the Act of 1883, the following provisions, which shall be known as sub-section 4b:— "When generic terms are used in chemical patents, the patentee shall specify by name or otherwise each substance or compound which he intends to include within such term or terms, and he shall only be entitled to claim as his invention those substances or compounds which have been so specified by him."

2.—Sub-section 4c:—"There shall be deposited at the Patent Office, along with the complete specification of chemical patents, duplicate samples, sufficient for analysis or examination of the result or results claimed, and of all raw and intermediate products used in obtaining such result of results, unless such raw or intermediate products shall be ordinary articles of commerce easily obtainable in this country."

3.—Sub-section 4d:—"The complete specifications of all patents relating to coal-tar colours, in addition to the samples of the coloring matters themselves, and the intermediate substances used in obtaining them, shall be accompanied by dyed specimens of cotton-wool or silk, showing the results obtained with one per cent. and two per cent. respectively of the dyes claimed. A complete statement of the method employed in dyeing in each case shall also be given."

The Committee are further of opinion that the words in clause 1, section 18, "from time to time," shall be altered, in the case of chemical patents, into "two years from date of application."

The Committee recommends that a copy of this Report be sent to all Members of Parliament representing the Manchester district, with the request that they will take the first opportunity of bringing the questions of chemical patents and the working of section 18 before the House of Commons, and that the co-operation of other Chambers of Commerce be invited, especially of all those which are established in chemical centres, such as London, Liverpool, Glasgow, Newcastle, &c.

IVAN LEVINSTEIN,

Chairman of the Chemical and Allied Trades Sectional Committee.

RELATIVE COSTS OF TRANSMISSION OF POWER.—The following comparisons of cost of transmission of power by various methods appeared in the *Revue Universelle des Mines*:—(1) Comparative cost on 10-horse power transmitted 1093 yards: By cables, 1.77 per effective horse-power per hour; by electricity, 2.21; by hydraulics, 2.90; by compressed air, 2.98. (2) Comparative cost on 50-horse power transmitted 1093 yards: By cables, 1.35 per effective horse-power per hour; by hydraulics, 1.87; by electricity, 2.07; by compressed air, 2.29. (3) Comparative cost on 10 effective horse-power transmitted 5465 yards: By electricity 2.64 per effective horse-power per hour; by compressed air, 4.66; by cables, 4.69; by hydraulics, 5.29. (4) Comparative cost on 50 effective horse-power transmitted 5465 yards: By electricity, 2.37 per effective horse-power per hour; by cables, 2.65; by compressed air, 2.99; by hydraulics, 3.02. Steam was the prime mover used in each of the above instances, and it appears that for long distances electricity takes the lead in economy over all other systems. It has also a great advantage in the facility with which the power may be subdivided, and there appears to be no doubt that in future coal mining electricity will be much used for coal-cutting, tunnelling, hauling, pumping, etc., as well as for lighting.

Legal.

QUEEN'S BENCH DIVISION.

ON JUNE 3RD.

THE CAPE COPPER COMPANY V. THE COMPTOIR D'ESCOMPTE DE PARIS—THE SOCIÉTÉ INDUSTRIELLE ET COMMERCIALE DES MÉTAUX.

(Before MR. JUSTICE DENMAN and MR. JUSTICE CHARLES.

THIS case had, with many others, arisen out of transactions alleged to have been entered into with the object of enhancing the prices of copper; and, indirectly, it raised a question as to whether combinations with that object are now illegal by the law of England since the Act of 1844 (7 and 8 Vict., c. 24), abolishing the offences of forestalling, regrating, and engrossing, and for repealing certain statutes passed in restraint of trade, the preamble of which was read to the Court in these terms, reciting that it was expedient that such statutes should be repealed, as it had been found by experience that the restraint laid by them upon the dealing in corn, meal, flour, cattle, and sundry other sorts of victuals, by preventing a free trade in those commodities, had a tendency to discourage the growth and enhance the price, &c. And this case also with the others raised a question as to the legality of combinations to fix prices so as to affect other traders injuriously, so as to create a monopoly, and prevent them from obtaining commodities at all, except at prohibitory prices—a question somewhat analogous to that involved in the case of the Mogul Steamship Company, lately decided in the Court of Appeal, and now before the House of Lords. The particular case, with others, had arisen out of a contract entered into in March, 1888, between the Cape Copper Mining Company (the plaintiffs) and the Société des Métaux, whereby the latter agreed with the former that the former should sell, and the latter buy, the copper to be obtained from the Copper Company's mines during three years, at the price of £70. a ton up to 5,750 tons, and for any excess beyond that quantity £42. 10. a ton, and a guarantee given in July by the Comptoir d'Escompte to the Copper Company. (There was another similar contract with a similar guarantee, in which latter document an English domicile in the City was adopted, and the law of England was to be applicable.) It appeared that in March, 1889, the Société des Métaux suspended payment, and a decree of liquidation was pronounced against them, and they, it was alleged, made default in their payments, and the plaintiffs (the Copper Company) sought to recover certain sums of £50,662. and £23,642 from the Comptoir d'Escompte upon their guarantee, and they had refused to pay, and then this action was brought, alleging that the Société des Métaux had failed to accept and pay for 2,000 tons of best select copper produced by the Copper Company at their works, and the plaintiffs alleged that they had sold for the Société 543 tons of the copper bought by the Société under the agreement, and prior to the sales had credited the Société with £44,822. in respect of such sales, which, however, had only realised £23,231., upon which the plaintiffs claimed to be entitled to the difference, and the total amount they claimed to recover was over £150,000, while in the other action the total amount involved above £600,000. The Comptoir d'Escompte had originally pleaded as their defence that the guarantee was *ultra vires*—that is, beyond their power to give; and they now sought, in consequence of recent disclosures, to add a defence, founded on the alleged illegality of the transaction, either by French or English law, as entered into with the object of raising the prices of the commodity and creating a monopoly, and tending to prevent other traders from obtaining it except at prohibitory prices, &c.

The ATTORNEY-GENERAL (with Mr. Bigham, Q.C., and Mr. H. Tindal Atkinson) appeared for the Comptoir d'Escompte in support of their application to be allowed to raise this defence, urging that the transaction certainly was illegal by French law, and stating that the manager had actually been prosecuted and convicted in France for the offence, under section 419 of the French Code Pénal, of a combination to prevent other traders from obtaining the commodity. Then, as to illegality of the transaction by English law, he urged that it was still illegal according to our law, and, at all events, the defence should be allowed to be raised, especially as in the Mogul case the question was indirectly raised; and it was now in the House of Lords.

Mr. FINLAY, Q.C. (with Mr. F. M. Abrahams) appeared for the plaintiffs (the Copper Company), and urged that the effect of allowing the defence would be to delay the trial. Moreover, he urged that the defence was not meritorious, for the Société des Métaux and the Comptoir d'Escompte had got an English copper company to enter into the transaction, and then set up that it was illegal. Further he denied the alleged illegality of the transaction, at all events by English law. He read the preamble of the Act of 1844 abolishing the old law as to "forestalling," and "regrating," and as to penalties on "badgers."

[MR. JUSTICE DENMAN.—What are badgers?] They were who bought corn or other victuals in one place and carried another to enable them to raise the price. The defence was founded on English law was futile, and as to French illegality, if it existed, must have been known long ago, and have been set up at the first. Now the only object of allowing it to be to delay the trial.

The ATTORNEY-GENERAL, in reply, urged that it was by to be taken as settled that such transactions were not still illegal by English law. For in the Mogul Steam Company case the Lord Rolls dissented from the decision, and the case was not appeal to the Lords. Then, as to the illegality by French law the law was known it was not known whether there had been violation of it in this transaction until the prosecution of the manager conviction had taken place only ten days before the present appeal was first made.

The COURT, in the course of the argument, had intimated doubt whether the new defence ought to be set up so far as on illegality by English law, but that it ought to be allowed by French law, and at the close of the arguments (which were lengthy) they gave judgment to that effect.

MR. JUSTICE DENMAN, in giving judgment, said he thought the defence must be restricted to illegality by French law, as he knew no English law by which such a transaction would be illegal. It could only be so, he said, by virtue of the old law of "forestalling," or "regrating," or "engrossing" (which latter was the term which would embrace such transactions as this), and that law was abolished by the Act of 1844, which had been referred to in the defence that the transaction was *ultra vires* was already raised that the transaction was beyond the powers of the company. He now sought to set up the defence of positive illegality both by English and French law, and as to the latter alone he thought the defendants ought not to be precluded from setting it up, but not to the former—that is, the English law. As to the objection that he thought the case might come on for trial in a reasonable time within the present sittings, if both parties did their best to do so. The defence, therefore, as to illegality by French law was allowed.

MR. JUSTICE CHARLES concurred.

IN THE HIGH COURT OF JUSTICE.

(Before LORD COLERIDGE and MR. JUSTICE WILLS.

LOCK V. WESTWOOD.

THIS was a case under the Employers' Liability Act, arising in circumstances rather singular. The plaintiff, the workman employed in a factory at Millwall, on the floor of which was a machine weighing two tons, which had been standing there six months being secured in any way except by its own weight. It was made of iron, and it was about 8ft. high, standing on one of four legs which were about 2ft square. Over the workshop where it stood was a "traveller," as it is called—a machine running on wheels or rollers, and with chains hanging from it to attach to any objects in the workshop. The plaintiff was engaged in painting the rafters of the roof, and he had been told by the foreman to "shift the traveller when it was in the way." He accordingly was so shifting it when, in some way, not explained (and no one else was present), the machine suddenly fell upon him and crushed him, doing him terrible injuries. He then brought this action in the Bow County Court to recover compensation, the judge leaving the case to the jury, they found a verdict in his favour. The employers appealed.

MR. TATLOCK, on their part, contended that there was no evidence of any negligence on their part, and, even assuming the fact that the direction "to shift the traveller" was wrong, there was no connection between it and the accident.

MR. MOYSES, on the part of the plaintiff, contended that the machine had stood in the workshop six months and could not have fallen unless it had been moved, and the only thing that could have moved it was the chains of the traveller, it must be assumed that the chains had come in contact with it, and, therefore, there was evidence of negligence in leaving the machine unsecured in any way and the chains hanging down over it, and telling the man to "shift the traveller."

The COURT, however, came to the conclusion that there was evidence of any negligence of the employers or their foreman in directing with or conducting to the accident; and, therefore, the verdict could not stand.

LORD COLERIDGE, in giving judgment, said with every respect to the learned Judge, he ought not to have left the case to the jury, as there was no evidence whatever to sustain the action. It was not to support such an action that there should be evidence of negligence, and there was none. It would be a shocking abuse of the Act if, under such circumstances, an action could be maintained.

were too apt, however, in such cases to give verdicts in favour of men injured without any evidence of negligence to affect the juries. Moreover, the plaintiff, and even the other workmen, at the machine was there and the "traveller" above it, and if as any danger they knew of it, so that even if there had been negligence it would by no means follow that the plaintiff would be liable to recover. But, in fact, there was no evidence of any such negligence as would sustain the action, and therefore the judgment was entered for the defendants.

JUSTICE WILLS concurred.
Judgment accordingly entered for the defendants.

AMERICAN IMPORTS.

In the year 1889 the total value of the imports of merchandise into the United States was 741½ millions of dollars, of which 484½ millions were dutiable and 256½ millions were free. On the dutiable imports the average *ad valorem* rate of duty collected was 45 per cent., the amount of duty collected having been 220½ millions of dollars, or 45 millions sterling. This corresponds to an average of about 1s. 6d. per head of the population, and is not, therefore, a very large sum for a free country—indeed, as the amount of duty levied *per capita* is not so much, indeed, as the amount of duty levied *per capita* in other countries, and not much more than the *per capita* revenue collected in the United Kingdom. But the incidence of the American Customs Tariff is exceptional. The amounts of duty levied on the principal classes of imports in each of the years 1880 and 1889 were as under:—

	1880.	1889.
	£=1,000 dols	£=1,000 dols.
Stuffs	1,356	1,161
Drugs, &c. .. .	4,079	5,017
Manufactures .. .	9,976	10,841
Ware and china .. .	2,356	3,694
Articles, perfumery, &c. .. .	2,258	2,781
Nuts	3,401	4,007
Hemp, and jute .. .	1,415	2,482
.. .. .	2,811	4,526
Crystals and precious stones .. .	707	1,232
Wool and its manufactures .. .	3,411	3,417
Confectionery, &c. .. .	42,210	55,995
.. .. .	14,016	17,342
And its manufactures .. .	29,238	41,355
And its manufactures .. .	1,336	1,776
Cotton	4,681	11,194
Iron and steel .. .	23,244	16,909

It might be clearer than the fact which this statement brings home that the American tariff does not have the effect that it is intended to have. As a fiscal instrument intended to exclude foreign goods it is a failure. It is not, and does not claim to be, a revenue like that of the United Kingdom; for it yields so enormous a sum that it has for years past been an embarrassment to American financiers to know what to do with their surpluses. The balance in the public treasury has increased by "leaps and bounds," having more than doubled between 1884 and 1889, and at the end of the latter year amounted to the unprecedented sum of 659½ million dollars, or 132 millions sterling. The National Debt has been liquidated with a swiftness that is unique in the history of modern nations. At the end of 1889 the outstanding principal of the debt, which was 1,919¼ millions of dollars at the end of 1880, had been reduced to 976 millions of dollars, or 194 millions sterling, less the cash in the Treasury. Put the other way, the debt of the United States, which was 69¼ dollars *per capita* in 1867, and 41 dollars *per capita* in 1879, had fallen to 15 dollars in 1889, while the interest *per capita* of the debt had been reduced from 384 dollars in 1867 to about half a dollar in 1889. It is, therefore, the National Debt of the United States is being paid off at so rapid a rate that in another few years, given the present conditions as now, no debt will remain, and a burden which was laid on for the benefit of posterity, and of which posterity ought to have a full share, will be discharged almost entirely by the generation which incurred it. Fiscal necessities, in these circumstances, do not call for an increase of Customs duties, which already contribute more than 10 per cent. of the total revenue of the country.

TEACHING FOREIGN LANGUAGES.—In the House of Commons, Mr. H. Wilson said that a better system of French teaching should be adopted, in order to give the students a colloquial knowledge of the language, which would be useful to those who might engage in commercial pursuits. Seeing the number of German clerks who come here, and the fact that their superior knowledge of foreign languages, he did not think that the teaching of foreign languages could be considered to be a waste of time. He regarded it as a very important matter. (Hear, hear).

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds.

ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Gas Plant generally.

BLACKMAN VENTILATING CO., LONDON.—Fans, Air Propellers, Ventilating Machinery.

GEO. G. BLACKWELL, LIVERPOOL.—Manganese Ores, Bauxite, French Chalk. Importers of minerals of every description.

BRACHER AND CO., WINCANTON.—Automatic Stills, and Patent Mixing Machinery for Dry Paints, Powders, &c.

BRUNNER, MOND AND CO., NORTHWICH.—Bicarbonate of Soda, Soda Ash, Soda Crystals, Murate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.

BUCKLEY BRICK AND TILE CO., BUCKLEY.—Fireclay ware of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.

CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Driers and Steam Traps (McDougall's Patent).

W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.

CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Salt, Benzole, Toluole, Xylol, and Nitro-compounds of all kinds.

J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps and Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.

R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Plant—Blowing Engines, Filter Presses, Sludge Pumps, &c.

DAVIS BROS., MANCHESTER.—Samples of Products from various chemical processes—Coal Distilling, Evaporation of Paper-lyes, Treatment of waste liquors from mills, &c.

R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Plants, Holders, Condensers, Purifiers, &c.

DOULTON AND CO., LAMBETH.—Specimens of Chemical Stoneware, Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.

E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Ozonised Bleached Esparto-Pulp, Ozonised Oil, Ozonised Ammoniated Lime, &c.

GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.

GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Sizing Materials, India-rubber Chemicals.

JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters.

JOSEPH KERSHAW AND CO., HOLLINWOOD.—Soaps, Greases, and Varnishes of various kinds to suit all requirements.

C. R. LINDSEY AND CO., CLAYTON.—Lead Salts, (Acetate, Nitrate, etc.) Sulphate of Copper, etc.

CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Carbolic Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants, &c.

MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours. Samples of Dyed Goods and Miscellaneous Chemicals, both organic and inorganic.

MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhausters, Silent Boiling Jets, Air Compressors, and Acid Lifters.

E. D. MILNES AND BROTHER, BURY.—Dyewoods and Dyewood Extracts. Also samples of dyed fabrics.

MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Makers of all kinds of heating appliances.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, Recovered Sulphur, etc.

ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings, illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent Valves.

J. ROYLE, MANCHESTER.—Steam Reducing Valves.

A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitute, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, and Disinfecting Fluids.

WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pumping Machinery. Speciality, their "Duplex" Pump.

JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-water Heater. Makes also of Multiple Effect Stills, and Water-Softening Apparatus.

THE BURNELL WOOL-WASHING MACHINE.

THIS is the invention of Mr. George Burnell, of Leeds, which substitutes the solvent method for the emulsion method that is in general use at present. The machine, which was constructed by Messrs. Pullan, Tuke, and Gill, of Elland-road, to the order of the patentee, has been exhibited on several occasions before experts, and its work tested, and similar trials of the machine have also been made in South Australia, where Mr. Burnell has worked for many years, and where he invented the machine. As a result of these trials several important improvements were suggested and have now been carried out by Mr. Burnell. The original machine, it will be remembered, consisted of two V shaped tanks, each containing in the upper part a large central drum surrounded by a series of rollers. The first or larger tank was filled with water up to the level of the lowest roller, and above that a continuous flow of benzene was kept up, the wool to be treated passing through the benzene in a direction opposite to that of the flow, and receiving a succession of squeezes between the rollers and the drum. This removed the fat and a large portion of the dirt, and the wool on being passed to the second tank, which contained warm water, was relieved of the potash and other remaining impurities. Methods were also adopted for recovering the benzene for use again, and for recovering the potash, wool fat, and other residuals for commercial purposes. The improved machine will consist of four instead of two stages, and will, in fact, embrace four machines in one. In the first tank the benzene will remove the wool fat and the heaviest part of the dirt. The second, which will also contain pure benzene, will remove the last traces of grease, and as the benzene will flow from the second tank into the first, it will be seen that after having the major part of its impurities removed the wool is immersed in a purer bath of benzene, and thus has the fat effectually washed out of it. The third tank will contain hot water to wash out the potash; and the fourth, a solution of potash soap to give the wool a last rinse and impart to it the beautiful white colour which is the great desideratum of the wool-washer. Each process—that of removing the grease and that of removing the potash, &c.—has thus been doubled, and it must add to the effectiveness of the work. All four tanks are fitted with a simple device by which the dirt settling to the bottom can be removed. The whole machine will be much simplified by the improvements. All the rollers will be more easy of access, and any of them will be removable and replaceable without interference with the others. The rollers are made of brass, which will obviate all inconvenience or damage through rust. The cover, or hood, which is necessitated by the volatile and inflammable nature of the benzene, will be more substantial, and will be made in separate parts, each of which can be removed and replaced separately. It will also be fitted with plate-glass windows, through which the work may be inspected while in progress. A model machine, of one-fourth the dimensions of the original, embodying these and other improvements, has been constructed, and was publicly tested on Wednesday at the Neville Works, Elland-road, before an assemblage of manufacturers—wool-scourers and others, when, we are informed, satisfactory results were obtained. The principle of the machine is believed to be good, though, of course, it has yet to undergo the further test of everyday use in manufacture. It is intended to float a company to work the patent.

DYEING BLACK ON COTTON WOOL.

THERE are at present three methods generally used for dyeing black cotton wool.

THE CATECHU BLACK

is obtained by first steeping the wool in a boiling bath overnight containing 10-20% catechu, $\frac{1}{2}\%$ CuSO_4 (copper sulphate). In the morning it is taken out and entered into a boiling bath of 1% bichromate of potash, after being worked in here for $\frac{1}{2}$ hour, it is then well washed and a fresh bath is got up in which there is boiled out 100% logwood chips for 1 hour, the logwood being withdrawn, the cotton wool is then entered and boiled for 1 hour, by this means we have obtained a good black, but it still wants the logwood fixing by entering into a solution of iron liquor and working in this bath for 20 minutes longer. After softening off the cotton wool (to render it easier to work up into yarn) by means of soap and oil it is then ready to be dried.

THE AMERICAN OR LOGWOOD BLACK

is dyed in a bath of a strong solution of logwood extract to which has been added a slight quantity of copper carbonate.

This latter salt is made by precipitating copper sulphate with soda ash.

The cotton wool is entered into this bath and boiled for 1 hour, it is then lifted out and put into a wool waggon and covered up so that it keeps warm, as it becomes much heavier and darker colour.

Next morning the wool is again entered into the same bath, to which

has been added about 1 lb. of soda ash. The bath is kept for 1 hour, the wool is again lifted and put into a wool waggon a warm by covering up, next morning it may be washed off and into a bath containing 1 lb. chrome to fully oxidize the logwood.

It only needs entering into a bath containing soap and 6 minutes, when it is ready to be dried.

This yields a very good black, and it is fairly fast to milling.

BENZIDENE BLACK.

This black product is one of the benzidine series, similar to benzopurpurine and chrysamine colours.

It is dyed with simply adding the 6% dyeware along with Glauber's salt. The great fault of this is that it gives very brown red blacks, and it is sometimes topped with $\frac{1}{2}\%$ aniline green cold bath. This is merely to produce an optical illusion, as it is altered into a blue black. The benzidine black is very apt for dark slates and dark blues, and it is also being used in the Continent as a bottom or ground for the dyeing of aniline black.

At present the high price is keeping it from being extensively applied to the dyeing of cotton wool black.

ANILINE BLACK.

Aniline black, by its properties, its mode of application, completely from the other blacks and from other aniline colours the latter are brought to the dyer already prepared for immediate use. Aniline black, on the contrary, is formed only on the fibre itself.

While most of the other aniline colours are fugitive, this contrary, is noted for its fastness to all reagents.

For a long time aniline black was only employed for tissues. The price of bichromate of potash, aniline, and the gas to which aniline blacks were liable, hindered it from being entered as a dyeing agent for the raw material trade.

Below is a recipe for dyeing aniline which is at once economical and permanent. The cotton is first wet out, and it is then entered into a cold bath composed of

Aniline oil 8%,
Hydrochloric acid 16%,
Sulphuric acid 16%,
Bichromate of potash 16%,
Ferrous sulphate 16%.

The cotton wool is worked in this bath for $1\frac{1}{2}$ hours. It is then washed and boiled out in a bath containing

5% Soap.

This softens the cotton, and yields a good blue black, fast to milling, stoving, and does not turn green on exposure to the air.

NO NECESSITY FOR TALL CHIMNEYS.

A MECHANICAL engineer, recently, in a conversation regarding an accident to the Clark Thread Company's chimney, expressed himself as believing that "the time will come when these tall chimneys would serve no more useful purpose than that of monument folly of their builders." The fuel used in a manufactory costs too much to allow twenty-five per cent of it to escape up a brick shaft, to go out of doors. It is true that the gases must leave the boiler at a comparatively high temperature, but there are factors entering into the question of heat transfer to which this heat could advantageously be transferred. In the feed-water, and the supply of the furnace, much of this heat may be directly returned to itself, while, by its application to the reheating of exhaust steam it is used for heating and manufacturing processes, to the interior cylinders of compound engines, and directly to purposes useful in the arts, the necessity for the direct combustion of an additional amount of coal to supply heat for these purposes, is avoided. But, it is urged, it is in the very direction of allowing of a considerable loss of the furnace gases that tall chimneys are built, for, to gain a draught with comparatively cool gases, the chimney must have a height or area, or both. To such an observation, the gentleman quoted, referred to the high rates of economy realized in maritime commerce, where anything like an approach to a tall stack is out of the question. In his opinion, future development will be in the direction of regaining from the flue gases, every possible unit of heat, a maintenance of the draft not by the maintenance of a tall cold hot gas, but directly by mechanical means. Mr. Hoadly has shown that the heat derivable from the gases is more than practically equivalent to the power required to operate a fan or blower to air to the furnace. If this proves to be true in general application, may dispense with the expensive, and often unsightly, tall chimneys, obtain a better control of the air supply to the furnace, and prevent the tendency to leakage of cold air through the setting, by maintaining the furnace and combustion chamber at a pressure greater than that of the atmosphere.—*Steam Power.*

THE WATER SAFETY LAMP.

Attention of the Home Office authorities having been drawn by Her Majesty's inspectors of explosives to the fact that between 300 and 400 deaths and about 2,000 cases of serious injury occur annually through the use of imperfect and dangerous mineral oil lamps, requested Professor Boverton Redwood, F.I.C., in conjunction with Sir Frederick Abel, F.R.S., to advise them upon this subject. Of the lamps submitted to and reported upon by Professor Redwood is the water safety lamp, in which a reservoir of water, the top of which is open to the flame of the lighted wick, is made to rush the latter immediately the lamp is overturned. The water contained in a casing or jacket placed directly over the oil chamber, having an annular opening around the wick chamber. Upon the being overturned the water immediately rushes out of the jacket, passing through the perforated air-passage to the wick or combustion-chamber, immediately extinguishes the flame. This ingenious but simple device is the invention of Mr. Devoll, C.E., who has thus succeeded in superseding the various mechanical arrangements by which the automatic extinction of this class of lamp has hitherto been effected. The present invention embodies the requisite qualities of simplicity, certainty of action, and cheapness, and it is equally applicable to ordinary cheap artisans' paraffin lamp and to those of the most expensive kind. A demonstration was given with this lamp yesterday at the Savoy Hotel, when a number of lamps were instantly extinguished by simply overturning or throwing against a wall or on the floor. A special test was the partial emptying of the water reservoir of a lamp, filling it up with paraffin, lighting the wick, and overturning the lamp, the light was at once extinguished.

THE COPPER TRADE.

Judging from present indications, it seems that the outlook in the copper market is most encouraging. During the first four months of the present year the production of lake copper was apparently about 10 per cent. more than for the corresponding period of 1889, yet in the face of this increased production prices have advanced. On May 10 it was reported that there were only 4,000,000 pounds of copper at the Lake Superior mines, and the bulk of this was sold. In former years there were from 22,000,000 to 28,000,000 pounds on hand at the opening of the season. At the same time it is announced that the bankers' holdings of copper, the remains of the French syndicate, have all been sold out. This showing that the demand has increased more than the supply is taken by some as an indication that the market could have taken care of even a larger amount. The stocks of Lake Superior mines are almost entirely owned in Boston. The effect of the present stimulus upon the market value of those stocks, in comparison of their present value with that existing under the influence of the French syndicate prior to its collapse, may be of interest to those who watch trade developments. Of the mine dividend-paying stocks on the Boston list, five are now selling higher than they were under the syndicate stimulus. The lowest market value of the stocks of these companies, before the formation of the syndicate, shows an average of 46¼; the highest price under the syndicate shows an average of 88¾; the lowest since the syndicate, 45; and the highest recently touched shows an average of 82 for the same companies' stocks. This places the aggregate market value of Lake Superior mining stocks prior to the operations of the French syndicate at £70,000; under syndicate control, when ingot copper sold at 16½, the market value of these stocks was \$55,712,500; after the rise in March, 1889, when lake ingot sold at 11 cents, the market value of the stock declined to \$29,756,250, while the value, with ingot at 10 cents, is \$51,845,000.—*American Manufacturer.*

MANUFACTURING SALT "IN VACUO."

R. Perry F. Nursey, past president of the Society of Engineers, read a paper before the members of that body, at the Westminster Town Hall, on the subject of "Picks' System of Manufacturing Salt *in vacuo*." Henry Adams, president of the Society, was in the chair. In the course of his paper, Mr. Nursey observed that the manufacture of salt carried on in the present day mainly in the same way as it was by remote ancestors—namely, in open evaporating brine pans. He compared an ordinary salt plant, pointing out the disadvantages of the old system, including the constant expense in repairs and renewal of pans, which sealed and buckled and at the best only lasted about five years; the heavy cost of fuel; for land (the pans covering large areas) and for labour; and the production of noxious gases, which were deleterious to animal and vegetable life. He then proceeded to describe Dr. Picks' vacuum process, which was based on the Rillieux or effect system. Dr. Picks' apparatus, he explained, is made in

duplicate sections, each consisting of four main parts, namely, the boiling chamber, the heating chamber, the collecting chamber, and the filtering chamber. The steam used enters the heating chamber of the first section and there heats the brine, and the steam given off from the brine enters the steam chamber of the second section and heats the brine there. The same process is repeated in the third section. The steam generated in the latter section from the brine, is drawn off by means of a vacuum pump condenser. The advantages, as demonstrated by the working of an apparatus put up by Mr. Nursey at a salt works in Staffordshire, were stated to be a saving in fuel, in labour, in area occupied, and the avoidance of the production of deleterious gases. The consumption of coal by the pan process was 12 cwt. per ton of fine white salt. By the new process a saving of 7 cwt. per ton was said to be effected where waste or exhaust steam was not available. The process the lecturer showed to be automatic, and to require no skilled labour in carrying it on. With regard to space, it was stated that an apparatus consisting of three sections, each 2½ yards in diameter, would turn out 50 tons of salt per day, or 300 tons per week, while a salt pan 12 yards long by 2½ yards wide, exclusive of brickwork, only turned out about 40 tons per week. The paper was illustrated by diagrams of the old and new systems, and the author exhibited samples of salt made from the same brine and at the same works, under the old and new processes. The superiority of the salt produced *in vacuo* was declared manifest both as regards fineness and greater density.

THE FRENCH AND BRITISH WORKMAN.

MR. BERNAL, in his last consular report from Havre, makes a brief comparison of the condition of the French and British working-classes. He refers to a statement made by Mr. Potter, one of a deputation of British working men who attended the Paris Exhibition, that he thought, on the whole, French workmen are better off than the industrial classes in England, and that the deputation did not see a drunkard or beggar during their stay in Paris. He would see too many of the latter in Havre, and after a comparison of the prices of provisions, groceries, &c., in that town, with those at which similar articles can be bought in the United Kingdom, Mr. Potter would probably change the first part of his opinion. The advantage the French Workman has over his English colleague is that the former, even in the case of equally steady men, will get more amusement out of a less expenditure of money; that the greater number of French women can make very savoury soups or dishes out of comparatively nothing, which hardly any English working-class woman knows how to do. The dock labourers of Havre, who go in from all parts of the country, and especially from Brittany, receive—the foremen 5s., and the men 4s. 2d. a day. No man is taken for less than half a day, and if kept after noon is entitled to a day's pay. If wanted after knocking-off time, 7½d. an hour is paid him. Night work is paid as day work, four hours counting as half a day; but a whole night is paid as a day and a half. Working hours vary according to the season of the year. After deducting half an hour for breakfast and two hours—12 to 2—for dinner, they range from 7½ in the winter to 9½ in the summer months. The wages paid in the other trades are as follows:—Masons and bricklayers, 6d.; their helps, 3½d. an hour; locksmiths, blacksmiths, painters, 6d.; joiners, 5½d. to 6d.; house carpenters, 6½d.; slaters, 7d.; workers in metal, 6d. to 7d. an hour; coopers, 4s. 10d.; and ship carpenters, 6s. 5d. a day. The hours of labour are about ten in summer and nine in the winter months. The rents paid by workmen range from £6. to £10. a year. The wages of bakers are, for a first-class hand, from £3. 4s. to £3. 12s., and for a second-class man from £2. to £2. 8s. a month, with board. The working hours are generally from 1 a.m. to 1 p.m., and even longer. The price of ordinary household bread is 10½d. the loaf of 6 lb. 9¾ oz.

THE TRADE OF INDIA.—The trade and navigation accounts of British India, made up to the close of the official year ending March 31st last, show a slight falling off in the value of imports, and a large increase, amounting to upwards of £4,295,000. sterling, in the value of exports. The total imports of merchandise and Government stores (excluding treasure), amounted in value to Rs. 69,199,376 (Rs. 1 = ten rupees), being Rs. 241,090 below the total for the previous year, but above the annual average of the previous five years by as much as Rs. 7,683,100. The falling off in the value of imports as compared with the figures for the year before, is explained by the large decrease in the imports of cotton yarns and textile fabrics, which quite overbalanced the increase under the head of metals, chiefly copper, which plays such a large part in native industries. The exports of Indian produce and manufactures during the 12 months amounted in value to over Rs. 99,088,333, being an increase of Rs. 6,445,598, over the figures for the previous year. This increase is mainly due to greater activity in the export of raw cotton, jute, and rape-seed.—*Times.*

THE IRON AND STEEL INDUSTRIES OF THE UNITED STATES.

IF anything more were needed to illustrate the material progress made in recent years by the great Republic on the other side of the Atlantic, it is amply provided for by the Report—always of considerable interest, but more than usually attractive on the present occasion—on the American iron trade in 1889, which has just been presented by Mr. James M. Swank to the American Iron and Steel Association, the headquarters of which are at Philadelphia. Beginning with pig iron, concerning which reliable data are available, thanks to the efforts of the American Iron and Steel Association and the British Iron Trade Association, we find that the output of crude iron during the last few years in the two countries was as follows:—

Years.	Great Britain.	United States.
	Tons.	Tons.
1882	8,586,680	4,623,323
1883	8,529,300	4,595,510
1884	7,811,727	4,097,868
1885	7,415,469	4,044,526
1886	7,009,754	5,683,329
1887	7,550,518	6,417,148
1888	7,998,909	6,489,738
1889	8,245,336	7,603,842

It will be seen that the British *maximum* production was attained in the year which begins the above table, while the United States are increasing their production of pig iron so steadily that they are evidently destined to become, at an early date, the leading pig-iron producing country in the world, possibly attaining this distinction in 1890. That the United States are using proportionately more pig iron than Great Britain is shown by the fact that the consumption of crude iron in this country rose from 7,052,291 tons in 1888 to 7,692,230 tons in 1889, while in the United States it jumped from 5,864,950 tons to 6,962,800 tons.

If we turn to the production of steel in the United States and Great Britain, the comparison is even more striking. We subjoin a table showing the production of Bessemer steel ingots (including Clapp-Griffiths steel ingots) and steel rails in Great Britain in the last 13 years, compared with the production of the United States in the same period. For the sake of strict accuracy, it should be observed that in the ingot tonnage for the United States for 1889 is also included the small quantity of Robert-Bessemer steel made in that year.

Years.	Great Britain.		United States	
	Ingots.	Rails.	Ingots.	Rails.
	Tons.	Tons.	Tons.	Tons.
1877 ..	750,000	508,400	500,524	385,865
1878 ..	807,527	622,390	653,773	491,427
1879 ..	834,511	520,231	829,439	610,682
1880 ..	1,044,382	732,910	1,074,262	852,196
1881 ..	1,441,719	1,023,740	1,374,247	1,187,770
1882 ..	1,673,649	1,235,785	1,514,687	1,284,067
1883 ..	1,553,380	1,097,174	1,477,345	1,148,709
1884 ..	1,299,676	784,968	1,375,531	996,983
1885 ..	1,304,127	706,583	1,519,430	959,471
1886 ..	1,570,520	730,343	2,269,190	1,574,703
1887 ..	2,089,403	1,021,847	2,936,033	2,101,904
1888 ..	2,032,794	979,083	2,511,161	1,386,277
1889 ..	2,140,793	943,048	2,930,204	1,510,057

The race between the two largest steel producers of the world has been keen, but the United States have now for some years eclipsed this country in the output of Bessemer steel ingots and rails. In the production of ingots, the race was won by America only in 1884, while with regard to Bessemer rails, the supremacy of the United States was asserted in 1879. Since that year, the construction of railways proceeded at a tremendous pace in the States, the mileage built reaching a total of 11,569 miles in 1882, after which, the rate of building fell off somewhat; but the total rose to 12,872 miles of new-track in 1887, the largest annual record ever made by any country.

If we consider all kinds of steel made by the two great steel-making countries, the United States were ahead of their European rival in 1886 and 1887. In 1888 and 1889, however, Great Britain again asserted her supremacy. She now excels as a steel producer, because of her large annual output of open-hearth steel, which is extensively used in ship-building in this country, a field in which the United States is idle, owing to its protective tariff having killed its mercantile marine.

The figures for the last six years' production of open-hearth are:—

Years.	Great Britain.	United States.
	Tons.	Ton.
1884	475,250	117,5
1885	583,918	133,3
1886	694,150	218,9
1887	981,104	322,0
1888	1,292,742	314,3
1889	1,429,169	374,5

The production of steel ingots of all kinds in the two countries may be summarized as follows:—

Description.	Great Britain.	United States.
	Tons.	Ton.
Bessemer steel	2,140,793	2,930
Open-hearth steel	1,429,069	374
Crucible steel (about)	100,000	75
Other steel	Nominal	5
Totals	3,669,862	3,385

The English statistics of finished iron do not cover the same ground as those published by the American Iron and Steel Association; therefore it is difficult to make comparisons. The output of pig bars in Great Britain was as high as 2,841,534 gross tons (of 2,240 lb.) in 1882; it fell to 1,616,701 tons in 1886, rising again to 1,717 tons in 1887, 2,031,473 tons in 1888, and 2,253,756 tons in 1889. The production of rolled iron of all descriptions in the United States in 1882 was 2,493,831 net tons (of 2,000 lb.); 1883, 2,348,874; 1884, 1,957,307 tons; 1885, 1,804,526 tons; 1886, 2,283,622; 1887, 2,588,500 tons; 1888, 2,411,654 tons; 1889, 2,586,38 tons. In gross tons the quantities were 2,153,263 in 1888, and 2,309,2 tons in 1889.

Reference was made above to the large use of open-hearth steel in this country for shipbuilding purposes. When it is considered that shipyards of the United States constructed but 34,354 tons of net piping in 1887, 36,719 tons in 1888, and 53,513 tons in 1889, while totals for Great Britain in those years were 577,327, 904,321, 1,288,251 tons respectively, the insignificance of the American building industry is obvious. The backward state of the United States with regard to the manufacture of tinplates, which is still in its mental stage in that country, will probably not continue if the provisions of the Tariff Bill now before Congress are retained when the bill is finally passed. It is surprising that no efforts have been made to "domicile" such an important industry in the United States, the use of tinplates is larger there than in any other country, and the imports, from this country chiefly, are enormous. The British imports of tinplates into the United States have steadily grown from 82,9 tons in 1871 to 331,311 tons in 1889; the total quantity of imports in 19 years being 3,293,404 tons, and their total foreign value \$283,671,246 (£56,724,249), irrespective of the freights and duties by the importers. Possibly the increase in the tinplate imports will still continue, for the requirements of provision "canners" and pet "packers" are still growing, and they do not look with favour on an increase of duty now proposed.

DYED SUGAR.

AN important meeting of the Society of Public Analysts took place on Wednesday evening, chiefly to hear Mr. Cassal's views on the subject of "Dyed Sugar." The interests of the trade, which thought to be in some peril from the action of the author, who was a slashing controversialist, were well represented by the presence of Messrs. Newlands and Heron. It appears that in Mr. Cassal's ordinary practice as a public analyst, he has recently come across numerous samples of sugar coloured yellow with some foreign colouring matter, probably of the nature of methyl orange, and out of 15 samples collected in Kensington, 10 were found to be thus treated. In his opinion this was nothing less than a fraud, and he had so regarded it in his certificates of analysis. The reactions of the dye-stuff were very pretty definite, and its detection therefore easy: a solution of hydrochloric acid added direct to about an ounce of the sample produces a purple pink colour, becoming reddish brown on standing; strong sulphuric acid has the same effect, but the reaction is marred by subsequent charring. The substance may be isolated by extracting the sugar with 90% alcohol, evaporating the solution to dryness, taking up again in alcohol, and dyeing with wool, slightly mordanted with aluminium acetate, in the solution the fast yellow colour on the skein is a sure indication of its presence; sugar, thus prepared, is known in the trade as yellow crystal.

12-13s. per cwt., as against 17-18s. for Demerara. Mr. [unclear], taking up the cudgels, revealed a state of things sufficiently [unclear] to the outsider, though familiar enough to the expert. It is that practically all sugar, white included, is coloured; these colouring matters being used for one class, chloride of tin for [unclear], and ultramarine or an aniline blue for the white varieties. Quantities are, however, in all cases, small; e.g., 1 part in 50,000 [unclear] O O O, and a more tangible, but still harmless, quantity of tin, so that the matter seemed of little moment. The object of colouring the sugar was merely to maintain a standard that any given sugar could be sold as a recognised grade of the [unclear].

The actual figures ruling for Demerara were 15s. 6d. to 16s. 9d. [unclear], and for "yellow crystals," 16s. 3d. to 17s. 3d., so that the price in [unclear] was actually in the reverse direction to that stated by [unclear]. The method of testing proposed was fallacious, as many artificially coloured gave no reaction. Mr. Heron mainly endeavoured to allay alarm as to the alleged toxic action of these [unclear] matters. He assured the meeting that nothing whose logical action was baneful was used. This brought Mr. Hehner [unclear] the fray, he declining to accept any assurance that was of so [unclear] a character. As to the notion that had been put forward that public taste demanded coloured sugars, it had no weight with him.

The popular taste used to demand beautiful green pickles (red with copper), brilliantly red bloater paste, mustard reduced to a [unclear] with flour, cocoa of the homeopathic variety in which predominated, and so forth, and it had been the duty of the analyst, and one which he had successfully performed, to [unclear] such products without regard to "popular taste" based on [unclear] ignorance. Had manufacturers been content to educate the [unclear] with the preferential consumption of colourless sugars, instead of [unclear] to their prejudice, none of this trouble would have arisen. [unclear] appears to be that the practice of colouring sugar is almost [unclear], and will not readily be displaced, and provided nothing be [unclear] which has not been proved innocuous, no real harm will result, [unclear] there is little doubt a technical offence will have been committed under the Food and Drugs Act.

Trade Notes.

TRUTH," last week, asked "Who is Joule?" We have pleasure in answering that he was an earnest seeker after TRUTH.

The two following announcements were inadvertently omitted from last week's issue:—

TUBES AND FITTINGS. JOSEPH AIRD, Wellington Tube Works, [unclear] Bridge, Staffordshire, announces a reduction in the price of [unclear] and fittings, of 5% gross.

MESSRS. HILDICK & HILDICK, of Walsall, Tube Manufacturers, announce that their discounts on plain and galvanized wrought iron [unclear], are increased 5% gross, as from May 20th.

OXALIC ACID.—Passing along Liverpool Streets between 8 and 9 a.m., the observer will note a number of porters and errand-boys [unclear] the brass window-plates with solutions of oxalic acid. These [unclear] most exclusively contained in wine or beer bottles; occasionally a [unclear]-beer bottle varies the monotony. It is rarely that a label is [unclear] on any of these bottles, notwithstanding the care taken by the [unclear] gists in selling the acid at the hands of a qualified man, and in [unclear] ling it "Poison." Reflecting on this, one must either believe in a special providence watches over solutions of oxalic acid, or that a [unclear] deal of nonsense is talked in judicial quarters about the law [unclear] of the public.

THE LEON COBALT AND COPPER COMPANY.—A new company [unclear] been formed in England under special circumstances to work [unclear] in Spain. This venture deserves some attention, as it marks the beginning of a new era in mining in Spain. The Spaniards [unclear] rally, after getting possession of a new mine, hand it over to [unclear] foreign capitalists, who form companies of which the working capital [unclear] foreign. The Spanish vendors receive shares as payment. The [unclear] of the Leon Cobalt and Copper Company is a new departure. Spanish holders of these mines, which cover some 350 hectares, [unclear] them for sale in England, and a company was organised in [unclear] ion with a capital of £50,000. The bankers, the Union Bank of [unclear] and England, offered these shares for sale in Spain, with the [unclear] cedented result that the demands for shares at Madrid and Bilbao [unclear] have been double the required capital. It is not yet known [unclear] applications there have been at the branches of Barcelona, [unclear] ncia, and Seville, nor in the mother establishment at London. [unclear] explanation of this is that the Spanish capitalists, especially [unclear] of Bilbao, have shown more confidence in the English manage- [unclear] of mining business than in their own, and that they are more [unclear] to put their money with them than in a mining business of a [unclear] Spanish character.

Dr. Corsar Ewart is Professor of Natural History in Edinburgh University, having been appointed when Professor Ray Lankester refused the post. Professor Ewart has for some time past professed a decided knowledge of pisciculture, and recently published in a Scotch newspaper a series of articles on mussel culture. The other day a journalist residing in the neighbourhood of Edinburgh raised an action in the Court of Session against the Professor for remuneration for these articles, which he declares were written by him. Professor Ewart kept the matter out of Court, it seems, by paying the plaintiff £50. and the costs of the case. But I should like to know who really wrote the articles. If the Professor, why did he pay the £50? If the journalist, why is he not made the Professor of Natural History in the University?—*Truth*.

COCOANUT BUTTER.—Within the last few months, says the *American Druggist*, a new trade has risen in India and has attained extraordinary dimensions. About two years ago a German chemist, Dr. Schlunk, discovered that excellent butter could be made from cocoanut milk. It is, according to a Bombay newspaper, pleasant to taste and smell, of a clear whitish colour, singularly free from acids, easily digestible, and an incomparably healthier and better article of diet than the cheap poor butters and oleomargarines of European markets. The manufacture is carried on in Germany, where one firm turns out from 3,000 to 4,000 kilogrammes daily. The cocoanuts required are imported from India, chiefly Bombay, in large and increasing numbers, and the trade seems likely to attain still greater importance.

A PIONEER OF INDUSTRY.—Mr. Arthur Robottom, well known in Liverpool, Birmingham, and London, &c., as a pioneer of commerce and introducer of new trade products, has left Liverpool by the *John Elder* for Brazil, Chili, and Peru on a voyage of discovery. One of his principal objects is to inspect a mountain in the Andes that is reported to contain a variety of chemicals naturally formed, and also borate of lime and nitrate of soda deposits. Mr. Robottom was one of the first to sell nitrate of soda for the manufacture of nitric acid. He was engaged in the manufacture of paraffin oil, and was instrumental in the introduction of corozo nut or vegetable ivory for button making. He also introduced to the trade piassava from Brazil, the keltol from Ceylon, borax from California, and a variety of other articles that now find employment for thousands of people who are engaged in working them up.

STOCKPORT GUARDIANS AND THE RATING OF MACHINERY BILL.—At the meeting of the Guardians of the Stockport Union, Mr. C. Earnshaw presiding, the question of taking further action in support of this measure was considered. The Guardians had petitioned Parliament in its favour.—Mr. R. Hammond, chairman of the Reddish Local Board, observed that amendments were threatened to the Rating of Machinery Bill, amendments which if passed would be a most serious thing to users of machinery in that neighbourhood. They should do all they could to strengthen the hands of the promoters of the bill.—Sir William Houldsworth asked that pressure might be put upon Mr. Ritchie before the third reading, which was appointed for the 18th instant; and as the Guardians were so largely interested in machinery and in the welfare of the district, they ought to do what they could to promote the passing of the bill as it now stood. The bill provided that for rating purposes the following machinery should be taken into consideration:—“(1) Outer wheels, steam, gas, air, and electric engines, steam boilers, and all other fixed motive powers, and the fixed appurtenances thereof; (2) shafts, wheels, drums, and other fixed power machinery which transmits the action of motive power to other machinery, fixed or loose (2a) save as in the last section provided, no machinery, whether attached to the tenement or premises or not, shall be taken into consideration in estimating such rateable value.” Mr. E. T. Cunliffe (Handforth): That is the bill as amended and accepted by Sir William Houldsworth, Mr. Mowbray, and those who have charge of it. Lieutenant Colonel Wilkinson and others spoke in favour of the bill, and on the motion of Alderman William Leigh, the Board decided unanimously to forward to Mr. E. J. Jennings, M.P., a memorial in support of the measure for presentation to Mr. Ritchie.

ILLEGITIMATE GERMAN ENTERPRISE.—In granting a perpetual injunction, with costs, last week against a German firm and their agents, restraining them from interfering with the rights of the proprietors of the liqueur manufactured at the famous Monastery of La Grande Chartreuse, Mr. Justice Kay made some severe remarks. The defendant's counsel had "wished to state" that in Germany it was competent for them to imitate the plaintiff's label, and that the bottles and labels in question had been sent over to this country under the impression that the English law would permit their use. The learned judge, who, the public will be pleased to hear, has quite recovered his health, answered this plea by declaring that "according to their own counsel's statement the defendants labelled their goods as being the product of La Grande Chartreuse well knowing they were not. They knew what they were doing was a lie intended to be imposed on people, and knowing it was a lie the contention was that what they did was

done with a view of finding out whether it was legal in England." Illegitimate German enterprise finds no favour in the eyes of Mr. Justice Kay.

SINGKEP, THE NEW TIN ISLAND IN EAST INDIA.—The Singkep Tin Company, concessionaire of the Island of Singkep, has raised its capital from 1,250,000 to 1,500,000 guilders—say £125,000—to ensure the regular working of the tin mines. Singkep promises to become a formidable rival to its great tin-producing neighbours, Banca and Blitong. Its size is about 50,000 hectares—say, 123,550 acres—and it belongs to the Lingga Islands, a group off the east coast of Sumatra, and formerly belonging to Johore and Malacca. The tin mines of Singkep are supposed to be of great antiquity. They were hitherto worked by the native Sultan, who is a vassal of Holland. He exported the ore to Muntok, the capital of Banca, or to Singapore, but Singkep tin was not known by itself in the European market, being sold for Banca or Blitong.

IRON MANUFACTURE IN INDIA.—The ironworks owned by the Bengal Iron and Steel Company (Limited), at Burakur, are a few miles distant from the junction of the East Indian and Bengal-Nagpore Railways, where arrangements have been made for the production of 30,000 tons of pig iron per annum from the ironstone and coal found in close proximity on the property. In the foundry preparations have been made for turning out cast iron water-pipes, sleepers, and other railway materials in very large quantities, the moulding being accomplished by hydraulic machines of the latest pattern, at rates which, it is expected, will render European competition difficult, if not impossible. The output of these works will not be confined to pig iron and casting, but as soon as practicable the production of wrought iron and steel, and its manufacture into beams and bars, will be commenced, and eventually the rolling of rails, girders, joists, and all sections of iron and steel in common use on railways and for building purposes.—*Indian Engineering*.

USES FOR OLD PAPER.—Most housekeepers know how invaluable newspapers are for packing away the winter clothing, the printing ink acting as defiance to the stoutest moth, some housewives think, as successfully as camphor or tar paper. For this reason newspapers are invaluable under the carpet, laid over the regular carpet paper. The most valuable quality of newspapers in the kitchen, however, is their ability to keep out the air. It is well known that ice, completely enveloped in newspapers so that all air is shut out, will keep a longer time than under other conditions; and that a pitcher of ice water laid in a newspaper, with the ends of the paper twisted together to exclude the air, will remain all night in any summer room with scarcely any perceptible melting of the ice. These facts should be utilized oftener than they are in the care of the sick at night. In freezing ice cream, when the ice is scarce, pack the freezer only three-quarters full of ice and salt, and finish with newspapers, and the difference in the time of freezing and quality of the cream is not perceptible from the result where the freezer is packed full of ice. After removing the dasher, it is better to cork up the cream and cover it tightly with a packing of newspapers than to use more ice. The newspapers retain the cold already in the ice better than a packing of cracked ice and salt, which must have crevices to admit the air.—*Scientific American*.

MINING IN DEVON AND CORNWALL.—The last annual report of Mr. Pinching, Inspector of Mines for Devon and Cornwall, has just been laid before Parliament. The total number of persons employed was 13,464, or 275 less than the previous year. The quantity of minerals wrought from the various mines of the two counties was 118,201 tons, of which 12,464 tons consisted of tin ore, 7,688 tons of arsenical pyrites, 7,618 tons of dressed copper ore, 4,758 tons of arsenic, 3,200 tons of iron ore, and 1,200 tons of barytes. Of the rest 81,051 tons consisted of clays, stone, and slate, and there were, in addition, small quantities of zinc ore, ochre, and copper. The number of deaths by accident in 1889 was 23, being one less than 1888, and the number per 1,000 was 1.70. The average for the past 17 years was 1.63. The inspector thinks that many of the accidents underground are due to the negligence of the miners themselves. There were four prosecutions, followed by the conviction of mine managers, during the year. Mr. Pinching thinks the proportion of accidents in connection with man engines is still larger than it should be. Tin mining, he observes, has progressed steadily during the year, in spite of market fluctuations. Amongst the several lodes which have shown a marked improvement the most important is that being worked at the Carn Brea mine, which has caused the shares to rise 500 per cent. value. Dolcoath mine adit, although sunk to a depth of over 400 fathoms, still continues to make large returns, and the lode at this great depth shows no sign of decreasing in value. Amongst other mines which have much improved during the year are Tincroft, Wheal Grenville, South Frances, West Kitty, and Wheal Kitty. During the year 24 mines, several of which were suspended last year, have been abandoned, 12 have been suspended, and 16 new mines have been started.

THE STORAGE OF GRAIN IN THE UNITED STATES.—The Consul at Baltimore in his last report describes a system of storing grain which, if generally employed, would revolutionize the present methods.

Should it prove a success, the elevators now in general use will be obsolete, and every farmer will be supplied with a substitute. He will be able to store his grain for years at little cost and The inventor maintains that he can manufacture steel tank required capacity, and at a cost averaging from, say, 2d. to 3s. each bushel of capacity, as against 1s. 8d. to 2s. now expended in wooden elevators. The steel tanks will be filled with grain by a simple process. When the tank is full a percentage of air is excluded and a quantity of carbonic acid gas admitted. The valves are closed and the grain will keep sound for years. Having excluded the oxygen there is no chance of fermentation, and, as a consequence, no decay or rot. At the same time, all animal life perishes and grain is secure against the ravages of weevils, which are so destructive. With a tank costing £100. the farmer has storage for 10,000 bushels and can hold his crop against low prices until the market improves. Fire cannot burn it nor rain injure it. The process by which the grain is manipulated is as simple as it is effective. It consists in an elevator, leading from which is a large pipe so arranged as to convey the grain in the receiver it is desired to unload. By means of a suction-fan the air is exhausted in the receiver, and the rush of air is sufficient, it is said, to draw the grain into the pipe, which it passes to the tank. Should the process prove a success, it will most eventually put an end to the proceedings of those whose business appears to be the making of fictitious value in bread stuffs.—*Times*.

THE AFFAIRS OF JAMES BERGER SPENCE.—A meeting was held last week at the London Bankruptcy Court under the failure of a debtor, who formerly traded at Manchester as a chemical, mineral merchant. He first acted as agent to his father in the Manchester business, and afterwards opened a branch in London. When he started on his own account he had no capital, but was subsequently joined by various partners, who introduced a total sum of £100,000 capital. The partnerships have all been dissolved and duly liquidated. He now states that he has debts amounting to about £10,000. He was the promoter of the Kruis River Cobalt Company, and £2,000. for advertising that undertaking. He claims 2,500 shares in Spence's Metal Company, the value of which is uncertain, but not yet received the shares, as they have not gone to allotment. Further states that he receives them in consideration of his services under another company of a similar nature now wound up. He holds 50 shares in the North Wales Gold Exploration Company. The Chairman stated that only two proofs had been lodged. The debtor had not yet filed his statement, although the proceedings were instituted in February last. In explanation the debtor stated that papers and documents had been in the hands of a former clerk without him he could not prepare a proper statement. Mr. Parker represented Mr. Robertson, the gentleman referred to by the Chairman and the only document held was a Swaziland concession. The Chairman inquiring if there was any offer to be submitted, the debtor said he had 60 acres of land at Erith upon a building lease at 10s. an acre, and there was every prospect of being able to sell it at sufficient to pay the unsecured creditors in full. The Court intimated that he should shortly apply to the Court for an adjournment. No resolutions were passed, and the matter was left in the hands of the Court to be wound up in the usual way.

A CHEMICAL WASTE.—It is not many years since sulphuric ammonia was a bye product, which was wholly lost. In 1889, for the year 1889, Mr. A. E. Fletcher, the chief-inspector of Alkali, &c. Works Regulation Act, makes a statement regarding the production of ammonia in the United Kingdom. In 1889, 1,333,604 tons of ammonia were produced in ironworks, shaleworks, and coke and carbonizing works, producing less than 133,604 tons. This is a great increase in twelve years over 122,785 tons. In 1877 the production was only 113,000 tons and odd. It is estimated that the value of last year's production was about £1,500,000. Yet, great as the saving already realized is, it is small in comparison with what might be made. If ammonia were saved from coke ovens, ironworks, and other works where the consumption of coal is large, the addition to the wealth would exceed ten times the amount now realized. It is little strange that so much of the sulphate of ammonia produced is exported to Germany. There it is used principally in the cultivation of beetroot. Seeing that the larger portion of this ammonia is produced in the gasworks scattered through the country, it is surprising that the British farmer does not see it to be to his advantage to buy that which may be had in his own market town rather than allow it to be carried away and shipped for the use of the farmer in Germany, who has to pay the carriage and other charges in addition to the price for which our farmers at home could purchase it.

THE CROWN ALUMINIUM WORKS.—Late in the occupation of the Crown Aluminium Company, at Yardley Wood, which were recently put up for auction, have been sold by private contract to a firm of manufacturers, but the price is not disclosed. The works, large residences, occupy about six acres of freehold land. The intention of the purchasers to re-open the works shortly.

NG OF MACHINERY.—A conference between the members of the Rating of Machinery Bill, and the President of the Government Board, the Attorney-General, and Mr. Walter Long, took place at the House of Commons last week. The decision came to the amendment agreed upon between the Attorney-General, the President of the Government, and Sir Henry James, on the part of the promoters of the Bill, should be placed upon the paper by Sir James. The amendment proposes to make clause 1 run as follows: "In estimating for the purpose of any valuation list, or poor, the local rate, the gross estimated rental or rateable value of any premises occupied for any trade, business or manufacturing purpose, any increased value arising from machinery, which is machinery used in the manufacturing process, and is only fixed to or sunk in the premises for the purpose of steadying it, and which can be removed without injury to the hereditament, or to itself, and does not require special construction or adaptation to the hereditament in which it is used, shall be excluded."

Market Reports.

REPORT ON MANURE MATERIAL.

increased activity which we referred to in our last report has continued throughout the past week, and a large volume of business has been concluded.

There are sellers of cargoes of hot-air dried Bull River phosphate at 10½d. per unit, cost, freight, and insurance to good U. K. and bids of less than this are being invited. Cargoes of land may be had at 9½d. per unit, cost, freight, and insurance to London. Quotations for the higher grades of Somme rather preclude business in large lines, 15¼d. c.i.f. asked for 70/75%, and 12d. for 75/80%, 1-5th rise in each case. For 55/60% about 10d. would be bid. The price for high grade Florida rock has hardly been bid but probably about 15d. on 80% in the dry would be business. Values of Canadian are 1s. 0½d. for 70%, 1s. 2d. for 75%, and 1s. 4d. for 80%, full delivered terms, 1-5th rise in each case. Quotations for Belgian remain unchanged.

Further cargo of River Plate bones, loading, is reported to have sold at £5. 7s. 6d. for U. K., and a bid of 15d. less for another cargo has not led to business. The ideas of holders of East of Scotland bone meal are strengthened by the advancing rate of exchange, and is also stopping business for shipment. It does not seem likely that anything under £5. 10s. would be accepted for shipment and nothing less would do for fine quality on spot, ex store. There is nothing fresh to report in crushed bones. Any parcels of grinding bones would sell readily at £4. 12s. 6d. for common parcels, up to £4. 17s. 6d. for clean dry hard bones. For River Plate bone ash £5. 7s. 6d. on 70%, nearest value.

Within the past week over 30,000 tons nitrate of soda arrived at London, sold at 7s. 10½d. to 7s. 11¼d., since which transactions have been paid for several further cargoes for U. K. The coast has been effectively cleared, and at the close the market is very firm. Spot cannot be bought under 8s. 1½d. for ordinary, 3d. for refined quality. Due cargoes are worth 8s., June-July about 8s. 4½d., September-October about 8s. 9d. per cwt., and good U. K. ports.

Red blood offers rather more freely, but there is nothing to be ordered 10s. 6d. per unit, f.o.r. at works, which price will probably be required for a 40-ton parcel of fine River Plate, now on the way, in about ten days.

Monite is quiet at 9s. 6d. per unit, f.o.r. at works. Kainit is at 40s. per ton. Supers quiet at 46s. 3d. per ton in bulk, f.o.r. in U. K., for 26%.

MISCELLANEOUS CHEMICAL MARKET.

There have been no changes of importance during the past week in the value of alkalis for early deliveries. Caustic soda remains firm at last week's quotation, viz., £9. for 74%, and £8. 5s. for 60% b.; lower grades in small demand, but prices nominally unchanged. The high strength caustic soda from the Tyne works seems to find ready outlet for export trade. Soda ash generally is in demand and though most of the makers are well engaged for some little head, and can command 1¾d. per degree for early deliveries, the market forward is more favourable to buyers, and quotations are at the market at 1¼d. to 1½d. at maker's works. Soda crystals, white, and chlorate of potash without any improvement. Bleaching powder steady at £4. 17s. 6d. rails for prompt, and £5. per ton, and forward. Vitriol and muriatic acids without change. Salt-

cake, 27s. to 28s. in bulk. Sulphate of copper rather more plentiful, but for June delivery firm at £24. 10s.; the high value of copper preventing any downward movement for the present. For future deliveries there are various speculative quotations from £20. to £22. per ton, according to period of deliveries required. Lead salts of all kinds still very quiet in demand, but without alteration in value. Tin crystals dearer in sympathy with the metal. Zinc oxides and salts are all firm in price owing to the high spelter market. Acetate of lime, brown, distinctly easier and more plentiful at £7. 10s. to £7. 12s. 6d. for early and forward deliveries; grey scarce at £13. Acetic acids of all grades are without any material changes. Potash, caustic, and carbonate are selling more freely, and makers are well booked with orders. Superphosphates of lime are in good demand as usual at this season, but supply is equal to requirements, and prices remain steady. Prussiate of potash keeps steady at 9½d. per lb., though no large business is being done. Bichromates quiet. Tartaric and citric acids are steady at 1s. 3d. per lb. for both.

TAR AND AMMONIA PRODUCTS.

The benzol market still retains its firm position, and 3s. 9d. for 90's and 2s. 9d. for 50/90's may be quoted as to-day's values. Solvent naphtha is still in good request, and creosote is moving off very freely. Crude carbolic acid is still flat, but sellers seem to have made up their minds not to accept any lower offers, and although 2s. has been bid for good 60's, makers everywhere refuse less than 2s. 2d. Anthracene is still weak, and sales of B have been reported at 1s. There have been no transactions in A quality, and therefore price cannot be stated. Pitch is out of season, and weak.

In sulphate of ammonia values remain unchanged at £11. 2s. 6d. to £11. 3s. 9d. f.o.b. Hull, and £11. 1s. 3d. to £11. 2s. 6d. Leith and Liverpool. It was only to be expected that the recent action of speculators has had the effect of driving away orders from the market momentarily, in consequence but few transactions have taken place, sellers seemingly being unwilling, so far, to concede the low rates demanded by buyers. Beckton price is nominally £11. 5s., while outside London makes are quoted at £11. 2s. 6d.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

There are still wanting genuine symptoms of recovery as regards the chemical market here, and on the contrary, the position to-day is, on the whole, even less satisfactory than it was a week ago. The extreme top price for sulphate of ammonia, spot, Leith delivery, is to-day no more than £11. 2s. 6d., or barely that. It is on report that £11. 1s. 3d. has been taken, but the evidence is of doubtful character, and probably no dealing has as yet taken place at so low a dip. Nevertheless buyers do not pay £11. 2s. 6d. at all readily, and makers being disinclined to give way further, there is hardly anything doing, and the forward basis is also idle. The output from the bichromate factories shows a slight improvement, but still halts considerably short of what is desirable. Bleach is nominally unchanged, but the market is quite a listless one. Caustics continue dropping, and borax, sulphate of copper, and nitrate of soda are all easier; most of the other common chemicals only hold former quotations, and about the only instance of a veritable rise is found in saltcake, which this week quotes dearer. Paraffins unchanged, scale and wax retaining their firmness, and burning oil still poorly. The last of the Scotch mineral oil companies to declare working results is the West Lothian, with no dividend; but the general outcome of the industry is on the whole satisfactory for the year. Chief prices current are:—Soda crystals, 52s. net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined, £29., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 5%, Tyne; caustic soda, white, 76°, £9. 10s., 70/72°, £8., 60/62° £7. 1s. 3d., and cream, 60/62° £6. 17s. 6d., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 15s., and 1 cwt. casks, £6. net Tyne; refined alkali, 48/52°, 1½d., less 1¼%, Tyne; saltcake, 27s. to 29s.; bleaching powder, £5. to £5. 2s. 6d., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s.; sulphate of ammonia, spot, £11. 2s. 6d. f.o.b. Leith; salammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £24., less 5% Liverpool; paraffin scale, hard and soft, 2¾d. per lb.; paraffin wax, 120°, semi-refined, 3¾d.; paraffin spirit (naphtha), 7d. a gallon; paraffin oil (burning), 6¾d. to 7d. on rails Glasgow to all Scotch buyers (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 865°, £5. 10s. to £6. per ton; 885°, £6. 10s.; and 890/895°, £7. 15s. to £8. Week's imports of sugar at Greenock were 33,868 bags.

THE LIVERPOOL COLOUR MARKET.

COLOURS are unchanged. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

THE LIVERPOOL MINERAL MARKET.

Our market has continued to rule fairly steady during the past week, and prices remain practically without alteration. Manganese: Arrivals have been somewhat larger, but as most of them have gone into consumption prices are unaltered. Magnesite: No alteration to report; prices in buyers' favour. Raw lump 26s., raw ground £6. 10s., and calcined ground £10. to £11. Bauxite (Irish Hill brand) in strong demand and prices firm—Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals have been larger, but the majority have gone direct into consumption, and prices are unchanged: 95s. to 100s. medium, 105s. to 110s. superfine. Barytes (carbonate) easier; selected crystal lump is scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; smalls, 50s.; best ground £6.; and selected crystal ground, £8. Sulphate: firm, and prices are better; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone unaltered; ground at £10., and specially selected lump, finest quality, £13. Iron ores somewhat easier. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 13s. to 15s. Purple ore quiet. Spanish manganiferous ore continues in fair demand. Emery-stone in fair demand; prices unchanged. No. 1 lump is quoted at £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal continue in fair request. Chrome metal, 5s. 6d. per lb. Tungsten alloys 2s. per lb. Chrome ore continues to offer pretty freely, and prices are easier. Antimony 24s. to 26s. Asbestos; the demand has improved; prices firmer. Potter's lead ore continues firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities—scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders, £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel easier. Chrome iron, unaltered at last quotations. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE TYNE CHEMICAL REPORT.

TUESDAY.

The Chemical market has been dull this week, and prices are again tending downwards. Transactions are few, and are chiefly for present wants. Bleaching powder has declined half-a-crown a ton, and soda crystals are one shilling per ton lower. Sulphate of soda unchanged, with little doing; soda ash and caustic soda are steady at last week's quotations. To-day's prices are as follows:—Bleaching powder, in softwood casks, £4. 17s. 6d. to £5. per ton; caustic soda, 77%, £9. per ton; ground, in 3-4 cwt. barrels, £12. per ton; soda ash, 48/52%, 1½d. per degree, less 5%; soda crystals, in 1 cwt. bags, £2. 13s. 6d. per ton, net weight; 2 cwt. bags, £2. 11s. per ton, net weight; in casks, £2. 11s. per ton, gross weight; sulphate of soda, in bulk, 32s. per ton; ground and packed in casks, 42s. per ton; recovered

sulphur, £4. 5s. per ton; chlorate of potash, 4½d. per lb.; soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. 140° Tw., £4. per ton; hyposulphite of soda, in 1 cw £5. 15s. per ton, in 5-7 cwt. casks, £5. 5s. per ton; pu sulphate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. chloride of barium, £8. per ton; nitrate of baryta, crystals, £ per ton; ground, £19. 5s. per ton; sulphide of barium, per ton—all f.o.b. Tyne, or f.o.r. makers' works.

Small coals, for manufacturing purposes, are now showing casiness, although colliery owners are still holding out for figure for first-class smalls; inferior qualities have been reduced a shilling a ton during the week. Prices range from 7s. to 8s ton for Northumberland small, and 8s. 6d. to 9s. 6d. per Durham small.

The following are the exports of chemicals from the Tyne month of May, and corresponding month of last year:—

	May, 1889. tons.	May, 1890. tons.
Alkali & Soda Ash.....	1,349	1,582
Bicarbonate of Soda.....	10	8
Bleaching Powder.....	2,141	2,317
Manure.....	67	622
Soda Crystals.....	2,593	1,511
Sulphate of Soda.....	7	53
Caustic Soda.....	(no separate return)....	1,240
Other Chemicals.....	3,766	1,183
	9,933	8,516

The Patent List.

This list is compiled from Official sources in the Manchester Laboratory, under the immediate supervision of George E. L. Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Treatment of Paper. J. M. Campbell. 8,183. May 27.
Feed Tank for Water Pipes.—(Complete Specification). E. D. Bert May 27.
Apparatus for Heating, Purifying, and Distilling Liquids. G. E. 8,192. May 27.
Production of Colouring Matter. J. Hall. 8,215. May 27.
Extraction of Gold from its Ores. W. A. A. Dowden. May 27.
Treatment of Sewage.—(Complete Specification). W. S. W. May 27.
Electric Welding.—(Complete Specification). W. R. Lake. 8,242.
Manufacture of Colouring Matters. W. R. Lake. 8,243. May 27.
Treatment of Waste India-Rubber. G. L. Hille. 8,250. May 27.
Scouring and Wiping Tinned Sheet Iron. G. F. Redfern. 8,251.
Manufacture of Manures. Sir E. R. Sullivan. 8,262. May 27.
Washing, Dyeing, and Treating Textile Materials. E. Sutcliffe Sutcliffe. 8,270. May 28.
Smoke Consumption. J. Moss. 8,275. May 28.
Dynamometers. E. Nixon and W. Millicham. 8,298. May 28.
Solidifying Mineral Oils and their Application for Combustion. Lagoutte, and G. de Velna. 8,294. May 28.
Refractory Linings for Converter Bottoms.—(Complete Specification). B. Versen. 8,295. May 28.
Brick-making Machinery. C. Huelser. 8,301. May 28.
Alizarine Blue Colouring Matters. J. Y. Johnson. 8,303.
Manhole Lids. J. Birch. 8,307. May 27.
Smoke Combustion. J. C. Jopling. 8,319. May 29.
Recovery of Mercury after Use for Gold and Silver Extraction. Wethered and A. E. Morgans. 8,324. May 29.
Treatment of Galvanisers' Waste Acids. A. G. Greenway May 29.
Concentrating or Separating Ores. W. McDermott. 8,352. May 29.
Treatment of Fuller's Earth. W. F. Keevil. 8,355. May 29.
Coating Metallic Surfaces with Tin. S. O. Cowper-Coles. 8,357.
Cleaning Tin Plates. M. R. Waddle. 8,364. May 30.
Manufacture of Colouring Matters.—(Complete Specification). R. Kramer, and W. Herking. 8,389. May 30.
Electric Switches. B. M. Drake, J. M. Jorham and P. J. Prin May 30.
Battery Compound. W. Wright. 8,394. May 30.
Purifying Feed Water. A. K. J. Kraus. 8,395. May 30.
Treatment of Iron Ores. H. Aitken. 8,399. May 30.
Dealing with Distillery Wash. A. Walker. 8,408. May 30.
Production of Coumarin Colouring Matters. B. Willcox. 8,411.
Manufacture of Artificial Stone. J. Hartnell. 8,413. May 30.
Smoke Prevention. S. K. Barnes. 8,418. May 30.
Apparatus for Manufacture of Wood Wool.—(Complete Specification). O. Evenstad and O. Senstad. 8,422. May 30.
Separation of Textile Fibres. E. Knecht. 8,452. May 31.
Solution of Calcium Phosphate in Carbonic Acid Water. T. I. and W. H. Symons. 8,454. May 31.
Manufacture of Soap Combined with Mineral Oils. J. B. Rol May 31.
Electric Switches. C. A. McEvoy. 8,474. May 31.
Machinery for Preparing Flax and other Fibre. A. T. Law Lawson and S. Dear. 8,475. May 31.
Electric Switches. S. F. Beevor. 8,477. May 31.
Priming and Detonating Composition.—(Complete Specification). and E. M. Gregory. 8,481. May 31.
Purifying Oils and Fatty Substances. W. B. G. Hogg and J. 8,484. May 31.

Copper Sulphate *continued.*

Lisbon, 5 t.	1 c.	£125
Constantinople, 2 t.	51	
Genoa, 5 t.	110	
Treport, 10	214	
Bordeaux, 47	1,125	

Coal Products—**Carbolic Acid**

Stettin, 10 cks.	£33	
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Naphtha

Calais, 1 mlt.	£6	
Copenhagen, 10 dms. 80 gals.	14	

Anthracene

Rotterdam, 130 cks.	£67	
Dusseldorf, 252	2,259	
Cologne, 252	1,603	
Rotterdam, 15	260	

Naphthalene

Hamburg, 2 cks.	£71	
Libau, 2	14	
Hamburg, 6	55	
Gothenburg, 1	10	
Philadelphia, 300	172	
Christiania, 1 c.	7	
New York, 17	61	

Benzole

Rotterdam, 36 cks.	£61	
" 20 pbs.	400	
Antwerp, 200	250	
Danzig, 1200 brls.	£50	

Pitch

Dunkirk, 106 t.	£150	
Rouen, 129	526	
Constantinople, 200 brls.	60	
Alexandria, 100	30	
New York, 10 cks.	15	
Antwerp, 123 t.	173	
Odessa, 950 brls.	247	

Chemicals (otherwise undeciphered)

Dunedin, 26 pks.	£119	
Melbourne, 15	54	

Disinfectants—

Calcutta, 105 cks.	£67	
Hong Kong, 75 dis.	54	
Shanghai, 2 cks.	40	
Colombo, 90	90	
Jamaica, 81 pks.	38	

Guano—

Dominica, 19 t.	£429	
Barbadoes, 20	200	
Trinidad, 100	1,000	

Manure—

Danzig, 9 t.	19 c.	£55
St. Kitts, 1	31	
Barbadoes, 26	276	
Antigua, 36	360	
Bordeaux, 21	10	150
Jamaica, 31	6	334
Barbadoes, 84		924
Guadeloupe, 49	5	550
Motril, 300		3,000
Malaga, 19	12	200
Dunedin, 100		1,350
Natal, 100		1,350
Demerara, 20		200
Hardadoes, 100		1,250
St. Lucia, 40	16	431
Barbadoes, 25		250
Jamaica, 120 bgs.		126
Salobreña, 194	1	1,649

Potassium Iodide—

Yokohama, 2½ c.	£167	
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Potassium Chlorate—

Philadelphia, 5 t.	£250	
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Sulphur Flowers—

E. London, 2 t.	4 c.	£23
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Sodium Sulphate—

Ghent, 85 t.	£65	
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Sheep Dip—

E. London, 6 t.	2 c.	£308
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Sodium Silicate—

Lyttelton, 20 brls.	£08	
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Sulphur—

Calcutta, 15 t.	12 c.	£90
Adelaide, 25		204
Mauritius, 101		538

Saltpetre—

Melbourne, 1 t.	£22	
" 2		43

Soda Crystals—

Constantinople, 3 t.	7 c.	£105
" 11		10

Uric Acid—

1760 lbs.	£50	
2000	12	
11 c.	£95	
110 lbs.	£71	
8 cks.	4	

LIVERPOOL.*Week ending May 31st.***Alum—**

St. John, N.B., 2 t. 12 c.	£11	
Sydney, 3	15	
Batoum, 10	58	
Constantinople, 12	62	
Galatz, 9	15	1 q.
Catania, 2	4	1
Calcutta, 52	200	

Alum Cake—

Ancona, 14 t. 7 c.	£41	
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Ammonium Nitrate—

Port Elizabeth, 1 t. 12 c. 1 q.	£16	
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Ammonium Carbonate—

Montreal, 1 t. 2 c.	£28	
Genoa, 9	15	
Havana, 6	14	1 q.
Barcelona, 1	2	1 q.
Odessa, 1	5	

Ammonia—

Talcahuano, 1 c.	£5	
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Ammonium Muriate—

Bilbao, 6 t. 10 c. 1 q.	£16	
Syria, 3	6	
Antwerp, 1	3	
New York, 1	3	

Ammonium Sulphate—

Valencia, 107 t. 9 c. 2 q.	£115	
Malaga, 101	12	1,143
Nantes, 41	6	493

Antimony Regulus—

Montreal, 100 c.	£35	
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Alum Sulphate—

Calcutta, 2 t.	1 q.	£15
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Borax—

Rouen, 57 t. 7 c.	£1,462	
Havana, 4	7	
Norroping, 1	13	46

Brimstone—

Calcutta, 22 t.	£130	
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Borate of Lime—

Rotterdam, 10 t. 4 c. 2 q.	£121	
New York, 94	1,092	

Bleaching Powder—

Antwerp, 30 cks. 7 brls.		
Bordeaux, 29		
Boston, 226		70 cks.
Calcutta, 70 cks.		
Copenhagen, 55		20 pbs.
Genoa, 80		
Leghorn, 153	26	
Lisbon, 22	10	
Montreal, 22		
New York, 154		
Oporto, 7		
Rouen, 133		
San Francisco, 190		
Valparaiso, 79 dms.		
Ancona, 120 cks.		
Boston, 207		
Genoa, 155		
Ghent, 132		
Hamburg, 27		
Montreal, 22	tes.	
Rotterdam, 29		
Venice, 40		

Caustic Soda—

Amsterdam, 125 dms.		
Ancona, 5		26 brls.
Antwerp, 17		
Bahia, 5		
Baltimore, 50		
Barcelona, 27		
Bari, 28		
Batoum, 804		
Bilbao, 40	17	
Carthage, 10		
Constantinople, 31		
Fairwater, 74		
Genoa, 183		
Ghent, 15		
Hamburg, 10		
Hong Kong, 28		
Ibrail, 52		
Leghorn, 61		
Lisbon, 60		
Malaga, 7		
Marseilles, 20		
Montreal, 50		
Nantes, 104		
Nagasaki, 50		
Naples, 96		
New York, 973		
Oporto, 60		
Philadelphia, 75	136	
Rotterdam, 81		
Rouen, 20		

Caustic Soda—continued.

St. Petersburg, 1,726 dms.		
San Francisco, 75		
San Sebastian, 15	15 cks.	
Santos, 20		
Seville, 100		
Talcahuano, 30		
Tarragona, 20	30 brls.	
Valparaiso, 100		
Venice, 79		
Algiers, 5		
Algoa Bay, 23		
Bari, 213		
Batoum, 100		
Bilbao, 6		
Carthage, 55	25	
Dunkirk, 18		
E. London, 15		
Genoa, 12		
Halifax, 30		
Malaga, 126	13	
Newfairwater, 20		
New Orleans, 50		
New York, 20		
Rotterdam, 10		
Tunis, 20		
Yokohama, 100		

Calcium Chloride—

Calcutta, 2 t. 1 c.	£6	
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Oleic Acid—

St. John's, N. F., 2 q.	£5	
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Copperas—

Salora, 1 t. 4 c. 2 q.	£5	
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Charcoal—

Havre, 13 t.	£47	
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Copper Sulphate—

Rouen, 91 t. 9 c.	£1,042	
Leghorn, 17	2 q.	12
Genoa, 26	11	492
Venice, 20	2	411
Bordeaux, 50	5	1,165
Havre, 5	1	29
La Union, 2	3	70
Leghorn, 2	10	15
Venice, 10	16	203
Genoa, 140	9	2,975
Ancona, 4	19	90
Antwerp, 4	19	95
Barcelona, 19	11	411
" 19	19	425
Bari, 6		110
Bilbao, 15	3	315
Bordeaux, 50	3	1,250
Leghorn, 27	4	525
Naples, 1	19	40
Tarragona, 4	19	110
Bilbao, 10		240
Bordeaux, 22	14	521
Genoa, 45	11	1,020
Havre, 5		120
Monte Video, 2	4	51
Nantes, 44	16	1,105
Bordeaux, 59	12	1,331
Nantes, 10		200
Barcelona, 10		224
Bordeaux, 29	18	645
Genoa, 27	13	508
Leghorn, 5	2	112
Marseilles, 19	7	381

Carbolic Solid—

Hamburg, 2 c. 2 q.	£10	
St. Louis, 5 t.	2	465

Carbolic Acid—

New York, 3 t.	£174	
Paris, 1	4 c. 2 q.	120
Rotterdam, 59	13	7,253
New York, 4	10	450
Havre, 7	10	95
Madras, 1		12

Chemicals (otherwise undeciphered)

Rio de Janeiro, 7 c.	£13	
Valparaiso, 6		35
Santos, 30 crbys.		34

Epsom Salts—

Bombay, 50 bgs.		
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Ground Spar—

Havre, 69 t. 15 c.	£500	
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Guano—

Bilbao, 1 t. 13 h. 2 q.	£16	
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Gypsum—

New York, 10 t.	1 q.	£30
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Hypophosphate of Lime—

Calcutta, 1 c.	£23	
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Iodine—

Hamburg, 6 t.	£1,600	
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Magnesia—

Manila, 2 c.		
Rio Janeiro, 5		
Porto Alegre, 11		

Manure—

St. Nazaire, 130 t. 1 c.	£383	
Barbadoes, 5	60	
Gr. Canary, 24	180	

Manure—continued.

Havre, 55 t. 4 c. 1 q.		
Antwerp, 5		3
Gr. Canary, 52	15	
Hamburg, 51		

Oxalic Acid—

Malta, 6 c.		
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Potassium Bichromate—

Antwerp, 16 c. 1 q.		
Rio de Janeiro, 3		

Phosphorus—

Vera Cruz, 12 c.		
" 12		2 q.
Havana, 18		
Kobe, 2		

Pitch—

Montreal, 200 brls.		
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Potassium Carbonate—

Boston, 8 t. 15 c.		
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Potashes—

Monte Video, 10 c.		
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Potassium Chromate—

Ultramarine —		
Holland,	4 cks.	Ohlenschlaeger Bros.
"	20	Hernu Peron & Co.
Belgium,	5	Leach & Co.
Koln,	17	G. Steinhof
Holland,	30 cs.	"
"	13	Phillipps & " Graves
Zinc Oxide —		
Germany,	50 cks.	J. Matton
Holland,	100 brls.	M. Ashby Ltd.
Germany	50	"

LIVERPOOL.

Week ending June 3rd.

Acetic Acid —		
Rouen,	2 cks.	R. J. Francis & Co.
Bones —		
Monte Video,	450 bgs.	A. Horny & Co.
"	700	"
Bone Meal —		
Bombay,	323 bgs.	A. V. Chutsey & Co.
Boracic Acid —		
Leghorn,	42 cks.	"
Barytes —		
Antwerp,	10 cks.	"
Borax —		
Leghorn,	120 cs.	"
Cream of Tartar —		
Barcelona,	5 hds.	Sachse & Klemm
"	10 cks.	"
Copper Precipitate —		
Huelva,	72 t.	"
Chemicals (otherwise undescribed)		
Rouen,	19 cks.	R. J. Francis & Co.
Dyestuffs —		
Myrabolams		
Bombay,	168 bgs.	D. Sassoon & Co.
"	2107	"
Sumac		
Palermo,	700 bgs.	"
"	600	260 bls.
Orchella		
Lisbon,	100 bls.	"
"	12	A. Barbosa & Co.
Yellow Berries		
Smyrna,	60 bgs.	"
Valonia		
Smyrna,	208 t.	"
"	20 bgs.	C. M. Elliadi
"	415 t.	Barry Bros.
"	100	114 bgs.
Rennet		
Rotterdam,	1 ck.	"
Extracts		
Rouen,	2 cs.	R. J. Francis & Co.
Philadelphia,	25 brls.	"
Logwood		
Savanna la Mar,	462 t.	11 c.
Horn Piths —		
Monte Video,	90 t.	R. B. Watson & Co.
Manganese —		
Odessa,	392 t.	"
Poti,	1850	"
Antwerp,	1 ck.	"
Manganese Ore —		
Carrizal Bajo,	510 t.	"
Coquimbó,	490	"
Poti,	1850	"
Phosphate —		
Montreal,	250 t.	"

Pyrites —		
Huelva,	1470 t.	Matheson & Co.
Permanganate —		
Rotterdam,	5 cks.	"
Saltpetre —		
Antwerp,	135 bgs.	J. T. Fletcher & Co.
Stearine —		
Rotterdam,	30 bgs.	"
Antwerp,	52	"
Sulphur —		
Catania,	60 bgs.	6 cks.
Palermo,	160	"
Tartar —		
Bari,	2 cks.	"
Naples,	2	"
Waste Salt —		
Hamburg,	500 bgs.	and a quantity.
Zinc Oxide —		
Rotterdam,	100 cks.	O. & H. Marcus
Antwerp,	85 brls.	"
"	135	"
Zinc Ashes —		
Boston,	24 brls.	"

GRIMSBY.

Week ending May 31st.

Chemicals (otherwise undescribed)		
Antwerp,	4 cks.	"
Rotterdam,	10 pks.	"
Glucose —		
Hamburg,	200 bgs.	12 cks
Manure —		
Kainit		
Hamburg,	500 pks.	500 bgs.
Zinc —		
Antwerp,	25 cks.	"

GOOLE.

Week ending May 28th.

Antimony —		
Boulogne,	2 cks.	1 cs.
Caoutchouc —		
Boulogne,	14 cks.	"
Dyestuffs —		
Extracts		
Rotterdam,	6 pks.	"
Alizarine		
Rotterdam,	8 pks.	"
Logwood		
Monte Christi,	366 t.	"
Dyestuffs (otherwise undescribed)		
Boulogne,	60 cks.	8 cs. 2 crbys. 2 pks.
Glucose —		
Hamburg,	33 cks.	"
"	25	"
Dunkirk,	100 bgs.	"
Muriate —		
Rotterdam,	10 cks.	"
Potash —		
Hamburg,	12 cks.	"
Calais,	54	"
Dunkirk,	6	21 drms.
Saltpetre —		
Rotterdam,	100 bgs.	"
Waste Salt —		
Hamburg,	650 cks.	320 t.
Zinc Oxide —		
Antwerp,	20 brls.	"

HULL.

Week ending June 5th.

Arsenic —		
Hamburg,	3 cks.	C. M. Lofthouse & Co.
Acetate of Lime —		
Helsingfors,	2 bgs.	J. Good & Sons
Barytes —		
Antwerp,	29 cks.	H. F. Pudsey
"	19	Bailey & Leatham
"	33	H. F. Pudsey
Bremen,	23	Tudor & Son
"	66	"
Brimstone —		
Catania,	878 pks.	Wilson, Sons & Co.
Bone Meal —		
Bombay,	862 bgs.	"
Chemicals (otherwise undescribed)		
Antwerp,	10 cks.	Wilson, Sons & Co.
Rotterdam,	2 cs.	W. & C. L. Ringrose
Bremen,	1 kg.	2 cs. 1 ck. Veltmann & Co.
"	35 cks.	Wilson, Sons & Co.
Dyestuffs —		
Logwood		
Boston,	200 bxs.	Wilson, Sons & Co.
Extracts		
Rouen,	7 cks.	Rawson & Robinson
Trieste,	20 brls.	Wilson, Sons & Co.
Fiume,	245	"
Sumac		
Trieste,	30 bls.	Wilson, Sons & Co.
Palermo,	625 bgs.	"
"	200	"
Valonia		
Trieste,	86 bgs.	Wilson, Sons & Co.
Madders		
Rotterdam,	2 cks.	Hutchinson & Son
Alizarine		
Rotterdam,	5 cks.	W. & C. L. Ringrose
"	103	Hutchinson & Son
"	3 cs. 14 cks.	W. & C. L. Ringrose
Myrabolams		
Bombay,	8050 bgs.	Wilson, Sons & Co.
Glucose —		
New York,	25 brls.	"
Hamburg,	100 bgs.	"
"	25 cks.	Bailey & Leatham
Stettin,	1200 bgs.	C. M. Lofthouse & Co.
"	400	37 cks.
Hamburg,	15 cks.	Rawson & Robinson
Rotterdam,	40 bgs.	Hutchinson & Son
Glycerine —		
Hamburg,	10 cs.	Lofthouse & Saltmer
Pitch —		
Dunkirk,	20 cks.	Wilson, Sons & Co.
Rouen,	23	"
Phosphorus —		
Rouen,	150 cs.	Wilson, Sons & Co.
Pyrites —		
Huelva,	547 t.	J. Dalton, Holmes & Co.
"	300	"
Sodium Nitrate —		
Hamburg,	808 bgs.	Wilson, Sons & Co.
Sulphur —		
Catania,	25 t.	"

Turpentine —		
Libau,	139 brl.	"
Charleston,	200	"
Tartaric Acid —		
Rotterdam,	7 cks.	"

GLASGOW.

Week ending June 5th.

Alum —		
Rotterdam,	15 cks.	J. Rankin
Barytes —		
Rotterdam,	46 cks.	"
Dyestuffs		
Extracts		
Nantes,	75 cks.	"
New York,	6 brls.	"
Dunkirk,	13 cks.	"
Antwerp,	4	"
Alizarine		
Rotterdam,	205 cks.	"
"	57	"
Glycerine —		
Hamburg,	20 drms.	"
Paraffin Wax —		
New York,	314 brls.	"
Pyrites —		
Huelva,	1,646 t.	Th
Sodium Silicate —		
Rotterdam,	5 cks.	J. Rankin
Tartaric Acid —		
Rotterdam,	2 cks.	J. Rankin
Tartar —		
Oporto,	8 cks.	"
Tartar Emetic —		
Hamburg,	7 cks.	"
Ultramarine —		
Rotterdam,	3 cs.	J. Rankin
Waste Salt —		
Hamburg,	296 bgs.	J. Poynt
"	100 t.	508 bgs.
Zinc Oxide —		
Antwerp,	75 cks.	"

TYNE.

Week ending June 3rd.

Barytes —		
Rotterdam,	86 cks.	Tyne
Copper Precipitate —		
Huelva,	5,981 bgs.	St
Glycerine —		
Hamburg,	3 drums	Tyne
Glucose —		
New York,	49 brls.	C
Paraffin Wax —		
New York,	175 brls.	C
Pyrites —		
Huelva,	1,295 t.	St
Saltpetre —		
Hamburg,	7 cks.	Tyne
Stearine —		
New York,	25 hgds.	C
Zinc Oxide —		
Antwerp,	50 brls.	Tyne

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending May 28th.

Acids (otherwise undescribed)		
St. Petersburg,	100 cs.	£250
Cologne,	400 pks.	636
Ammonium Sulphate —		
Hamburg,	50 t.	£570
Rotterdam,	60	720
"	30	10
Cologne,	40	10
Demerara,	50	3
Anthracene —		
Dusseldorf,		£348
Arsenic —		
Wellington,	2 t.	£26
Yokohama,	1	10 c.

Alum Cake —		
Calcutta,	250 cks.	£171
Acetic Acid —		
Melbourne,	3 t.	6 c.
Ammonium Carbonate —		
Yokohama,	1 t.	£38
Bremen,	56 pks.	157
Bone Ash —		
Mauritius,	300 t.	£1,354
Glucic Acid —		
Boston,	1 t.	£135
Smyrna,	1 kg.	10
Odessa,	4	29
Hamburg,	2 c.	14
Brussels,	3	23
Yokohama,	10	68
Genoa,	10	74

Glucic Acid—continued.		
Leghorn,	10 c.	74
Naples,	2	15
Marseilles,	2	15
Melbourne,	1/2	4
Seville,	15	111
Philadelphia,	10 1/2 c.	74
M. Video,	2	16
B. Ayres,	4	32
St. Petersburg,	15	111
Cream of Tartar —		
Dunedin,	1 t.	£101
Adelaide,	10 c.	56
Rockhampton,	1	162
Sydney,	1	215
Melbourne,	5	24
M. Video,	4	44
Adelaide,	10	56
B. Ayres,	2	22

Carbolic Acid —		
Genoa,		9 c.
Hawkes Bay,		50 drs.
Carbolic Solid —		
Genoa,		18 c.
New York,		555 lbs.
Caustic Soda —		
Sydney,	3 t.	2 c.
Bilbao,	13	13
Lyttleton,	15	4
Adelaide,	30	
Copper Sulphate —		
Marseilles,	2 t.	4 c.
Bordeaux,	25	
Sydney,	2	

PRICES CURRENT.

WEDNESDAY, JUNE 11, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Prices stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
c, 25 % and 40 % per cwt.	7/-	&	12/6
Glacial			65/-
ic, S.G., 2000°			0 12 9
mic 82 % nett per lb.			0 0 6½
ic			0 0 3½
atic (Tower Salts), 30° Tw. per bottle			0 0 8
(Cylinder), 30° Tw.			0 2 11
80° Tw. per lb.			0 0 2
us			0 0 1¾
ic nett			0 0 3¾
.. .. .			0 1 1½
uric (fuming 50 %) per ton	15	10	0
(monohydrate)			5 10 0
(Pyrites, 168°)			3 2 6
(" 150°)			1 4 6
(free from arsenic, 140/145°)			1 7 6
urous (solution)			2 15 0
ic (pure) per lb.			0 1 0½
aric			0 1 3
, white powdered per ton	13	0	0
loose lump			4 17 6
a Sulphate (pure)			5 0 0
" (medium qualities)			4 10 0
ium per lb.			0 15 0
nia, 880=28° per lb.			0 0 3
=24°			0 0 1¾
Carbonate nett			0 0 3½
Muriate per ton	23	0	0
" (sal-ammoniac) 1st & 2nd per cwt.	37/-	&	35/-
Nitrate per ton	40	0	0
Phosphate per lb.			0 0 10½
Sulphate (grey), London per ton	11	6	3
" (grey), Hull			11 5 0
Oil (pure) per lb.			0 0 10½
Salt			0 0 9
ony per ton	75	0	0
(tartar emetic) per lb.			0 1 1
(golden sulphide)			0 0 10
Chloride per ton	8	5	0
Carbonate (native)			3 12 6
Sulphate (native levigated)			45/- to 75/-
ing Powder, 35 %			4 17 6
Liquor, 7 %			2 10 0
ide of Carbon			13 0 0
ium Acetate (crystal) per lb.			0 0 6
n Chloride per ton	2	2	6
Clay (at Runcorn) in bulk			17/6 to 35/-
ar Dyes:—			
rine (artificial) 20 % per lb.			0 0 9
enta			0 3 9
lar Products			
racene, 30 % A, f.o.b. London per unit per cwt.	0	1	5
ol, 90 % nominal per gallon			0 3 10
50/90			0 2 10
olic Acid (crystallised 35°) per lb.			0 0 7½
" (crude 60°) per gallon			0 2 2
sote (ordinary)			0 0 2½
" (filtered for Lucigen light)			0 0 3
ie Naphtha 30 % @ 120° C.			0 1 4
se Oils, 22° Tw. per ton			3 0 0
i, f.o.b. Liverpool or Garston			1 8 0
ent Naphtha, 90 % at 160° per gallon	0	1	9
ven Oils (crude)			0 0 2½
(Chili Bars) per ton	58	5	0
Sulphate			24 10 0
Oxide (copper scales)			57 10 0
ne (crude)			30 0 0
(distilled S.G. 1250°)			60 0 0
.. .. . nett, per oz.			0 0 9
lphate (copperas) per ton	1	10	0
lphide (antimony slag)			2 0 0
sheet) for cash			14 10 0
Litharge Flake (ex ship)			15 10 0
Acetate (white ")			24 0 0
" (brown ")			18 0 0
Carbonate (white lead) pure			19 0 0
Nitrate			22 0 0

Lime, Acetate (brown)	£	s.	d.
" " (grey) per ton	7	10	0
Magnesium (ribbon and wire) per oz.	0	2	3
" Chloride (ex ship) per ton	2	5	0
" Carbonate per cwt.	1	17	6
" Hydrate			0 10 0
" Sulphate (Epsom Salts) per ton	3	0	0
Manganese, Sulphate			17 10 0
" Borate (1st and 2nd) per cwt.	60/-	&	42/6
" Ore, 70 % per ton	4	10	0
Methylated Spirit, 61° O.P. per gallon	0	2	2
Naphtha (Wood), Solvent			0 3 11
" Miscible, 60° O.P.			0 4 4½
Oils:—			
Cotton-seed per ton	22	10	0
Linseed			26 0 0
Lubricating, Scotch, 890°—895°			7 5 0
Petroleum, Russian per gallon	0	0	5¾
" American			0 0 5¾
Potassium (metal) per oz.	0	3	10
" Bichromate per lb.	0	0	4
" Carbonate, 90% (ex ship) per ton	19	10	0
" Chlorate per lb.	0	0	4½
" Cyanide, 98%			0 2 0
" Hydrate (Caustic Potash) 80/85 % per ton	22	10	0
" " (Caustic Potash) 75/80 %			21 10 0
" " (Caustic Potash) 70/75 %			20 15 0
" Nitrate (refined) per cwt.	1	2	6
" Permanganate			4 2 6
" Prussiate Yellow per lb.	0	0	9½
" Sulphate, 90 % per ton	9	10	0
" Muriate, 80 %			7 15 0
Silver (metal) per oz.	0	4	0½
" Nitrate			0 2 9
Sodium (metal) per lb.	0	4	0
" Carb. (refined Soda-ash) 48 % per ton	6	2	6
" " (Caustic Soda-ash) 48 %			5 2 6
" " (Carb. Soda-ash) 48 %			5 7 6
" " (Carb. Soda-ash) 58 %			6 10 0
" " (Soda Crystals)			2 17 6
" Acetate (ex-ship)			16 0 0
" Arseniate, 45 %			11 0 0
" Chlorate per lb.	0	0	6½
" Borate (Borax) nett, per ton	29	0	0
" Bichromate per lb.	0	0	3
" Hydrate (77 % Caustic Soda) (f.o.b.) per ton	9	15	0
" " (74 % Caustic Soda)			9 0 0
" " (70 % Caustic Soda)			8 5 0
" " (60 % Caustic Soda, white) (f.o.b.)			7 5 0
" " (60 % Caustic Soda, cream)			7 2 6
" Bicarbonate			5 15 0
" Hyposulphite			5 10 0
" Manganate, 25%			9 0 0
" Nitrate (95 %) ex-ship Liverpool per cwt.	0	8	0
" Nitrite, 98 % per ton	28	0	0
" Phosphate			15 15 0
" Prussiate per lb.	0	0	7½
" Silicate (glass) per ton	5	7	6
" " (liquid, 100° Tw.)			3 17 6
" Stannate, 40 % per cwt.	2	2	6
" Sulphate (Salt-cake) per ton	1	7	6
" " (Glauber's Salts)			1 10 0
" Sulphide			7 15 0
" Sulphite			5 5 0
Strontium Hydrate, 98 %			8 0 0
Sulphocyanide Ammonium, 95 % per lb.	0	0	7½
" Barium, 95 %			0 0 5¾
" Potassium			0 0 8
Sulphur (Flowers) per ton	7	10	0
" (Roll Brimstone)			6 0 0
" Brimstone: Best Quality			4 7 6
Superphosphate of Lime (26 %)			2 12 6
Tallow			25 10 0
Tin (English Ingots)			100 0 0
" Crystals per lb.	0	0	6½
Zinc (Spelter) per ton	23	0	0
" Chloride (solution, 96° Tw.			6 0 0

Salt—		
Ambriz,	25 t.	
Amsterdam,	100	
Antwerp,	220	
Barbadoes,	66½	
Beruford,	198	
Black Point,	5	
Boston,	385	
Calcutta,	3,071	
Cameroon,	40	
Conakry,	377½	
Coquimbo,	286	
Gfite,	205	
Ghent,	1,376	
Halifax,	130	
Hamburg,	8½	
Kingston,	200	
Landana,	1,939	
Melbourne,	463	
Montreal,	291	
Newfahwaster,	208	
Norroping,	100½	
Ofjord,	20	
Old Calabar,	100	
Abonnema,	100	
Montreal,	660	
New York,	107½	
Para,	196 t. 8 c.	
Quebec,	500	
St. John N.B.,	1,104	
Shediac,	300 10	
Valparaiso,	91	
Montego Bay,	346	
Sodium Silicate—		
Bari,	30 brls.	
New York,	10	
Soda Crystals—		
Canada,	100 kgs.	
Constantinople,	107 brls.	
Coquimbo,	50	
Malta,	50	
Montreal,	50	
Talcahuano,	20	
Toronto,	100 kgs.	
Valparaiso,	50	
Boston,	280	
Halifax,	40	
Sodium Bichromate—		
Genoa,	8 c.	£11
Leghorn,	2 t. 10	70
Sodium Chlorate—		
Stettin,	9 c.	£25
Valencia,	8 c.	£20
Saltcake—		
Baltimore,	202 t. 5 c.	£462
Saltpetre—		
Pernambuco,	5 t. 14 c. 1 q.	£120
Maceio,	10	11
"	1 10	32
Pernambuco,	2 13 2	40
San Francisco,	5	115
Piræus,	3 15	82
Barbadoes,	19 2	14
Salammoniac—		
Beyrout,	1 t. 19 c.	£67
Malta,	3	5
Alexandria,	1	34
Bombay,	5 4	185
Montreal,	10 1 q.	18
Constantinople,	2 t.	68
Salonica,	1	34
Sheep Dip—		
Algoa Bay,	4 t. 7 c.	£175
Baltimore,	2 1 2 q.	50
E. London,	3 14	130
Montreal,	5 cks.	23
E. London,	5 18	200
Sodium Biorate—		
Rotterdam,	4 t. 13 c. 1 q.	£140
Hamburg,	16 3	482
Antwerp,	3 11	108
Hamburg,	10 4 2	307
Soda Salts—		
Montreal,	3 t.	£76
Sulphur—		
Montreal,	25 t. 1 c. 1 q.	£141
Nantes,	19 1 3	416
Porto Alegre,	1 3 2	8
Montreal,	4	31
"	4 2 1	27
New York,	50 2	220
Pernambuco,	1 1 2	7
Sodium Nitrate—		
Demerara,	15 t. 9 c. 1 q.	£126
Lisbon,	50 2 2	407
New York,	1 2	30
Ancona,	1 6	11
Sulphuric Acid—		
Monte Video,	1 t. 10 c.	£18

Tar—		
Leghorn,	1 ck.	
Rotterdam,	93 t. 1 c.	
Quebec,	6 brls.	
Sierra Leone,	20 dms.	
Tartaric Acid—		
Havana,	1 c.	£8
Zinc Chloride—		
New York,	2 t. 11 c.	£51

TYNE.

Week ending June 3rd.

Antimony—		
Hamburg,	10 t. 10 c.	
Alkali—		
Rotterdam,	3 t. 5 c.	
New York,	116 16	
Calmar,	28 14	
Amsterdam,	2 10	
Riga,	6 15	
Horsens,	1 4	
Helsingfors,	2 13	
Alum—		
Odense,	5 t. 7 c.	
Ammonium Carbonate—		
Rotterdam,	2 t. 4 c.	
Barcelona,	11	
Randers,	12	
Ammonium Sulphate—		
Rotterdam,	35 t.	
Rouen,	10 2 c.	
Valencia,	30	
Barytes Carbonate—		
Rouen,	25 t. 15 c.	
Barium Chloride—		
Hango,	1 t. 2 c.	
Bleaching Powder—		
Malmo,	10 t. 3 c.	
Rotterdam,	13 14	
Drontheim,	14	
Copenhagen,	11 3	
Liban,	4 5	
Gothenburg,	16 15	
New York,	185 9	
Rouen,	5 10	
Amsterdam,	44 10	
Bergen,	5	
Riga,	49 18	
San Francisco,	106 6	
Antwerp,	18 6	
Hamburg,	35 5	
Barcelona,	1 3	
Gothenburg,	14 14	
Christiania,	2 5	
Horsens,	1 4	
Odense,	3 12	
Helsingfors,	30 4	
Lisbon,	5 5	
Barytes—		
Hamburg,	1 t.	
Baryta Nitrate—		
Barcelona,	19 c.	
Copperas—		
Hango,	1 t. 1 c.	
Caustic Soda—		
Copenhagen,	2 t. 6 c.	
New York,	252 9	
Riga,	35 9	
San Francisco,	14 10	
Antwerp,	9 9	
Hamburg,	10 19	
Barcelona,	15 15	
Horsens,	1 9	
Abo,	2	
Copperas—		
Bergen,	1 t. 7 c.	
Litharge—		
Copenhagen,	1 t. 15 c.	
Rouen,	3 2	
Riga,	2 15	
Barcelona,	10	
Magnesia—		
Liban,	1 c.	
Hamburg,	10	
Barcelona,	9 t. 12	
Naphthaline—		
Riga,	25 t. 9 c.	
Antwerp,	19 19	
Plumbago—		
Bilbao,	12 c.	
Potassium Chlorate—		
Malmo,	1 t. 8 c.	
Rotterdam,	3 16	
Antwerp,	1 2	
Hamburg,	1 10	
Horsens,	1	
Wyburg,	1 10	
Pitch—		
Antwerp,	100 t.	

Paraffin Wax—		
Barcelona,	8 t. 3 c.	
Saltpetre—		
Copenhagen,	1 t.	
Sodium Bicarbonate—		
Odense,	7 t. 19 c.	
Soda—		
Malmo,	5 t. 13 c.	
Rotterdam,	11 17	
Nakskov,	19 19	
Drontheim,	11 11	
Odense,	13 3	
Aalborg,	7 10	
New York,	100	
Amsterdam,	11 17	
Aarhus,	7 2	
Randers,	22 2	
Christiania,	5 6	
Horsens,	19 8	
Odense,	21 1	
Abo,	3 15	
Hango,	1 7	
Wyburg,	11	
Superphosphate—		
Riga,	220 t. 1 c.	
Soda Ash—		
Rotterdam,	6 t. 13 c.	
Copenhagen,	30 8	
Liban,	40 5	
Gothenburg,	26 12	
Aalborg,	3 6	
New York,	129 2	
Calmar,	76 16	
San Francisco,	25 25	
Antwerp,	2 13	
Gothenburg,	25 10	
Christiania,	2 10	
"	2 9	
Odense,	17 5	
Hango,	3 10	
Lisbon,	40 1	
Sodium—		
Hamburg,	1 box	
Sodium Hyposulphate—		
Barcelona,	12 c.	
Sulphuric Acid—		
Hango,	11 c.	
Sodium Sulphate—		
Riga,	12 t. 7 c.	
Hango,	1 6	
Zinc Sulphate—		
Barcelona,	18 c.	

HULL.

Week ending June 3rd.

Alum—		
San Francisco,	94 cks.	
Bleaching Powder—		
Stettin,	316 cks.	
Borax—		
Liban,	1 ck.	
Riga,	2	
Bone Size—		
Bremen,	10 cks.	
Harlingen,	10	
Caustic Soda—		
Liban,	170 drums.	
Marseilles,	120	
Nicolaieff,	108	
Riga,	528	
Chemicals (otherwise undescribed)		
Amsterdam,	30 cks.	
Antwerp,	9 74 pks.	12 cs.
Alexandria,		
Boston,	100	
Copenhagen,	4 21	
Danzig,	87 18	
Guernsey,	20	
Genoa,	30	
Gothenburg,	5 12	
Hamburg,	9 68	116
Konigsberg,	25	
Liban,	98	
Lisbon,		
Marseilles,	4 14	25
New York,	65	6
Odessa,	235 4	
Riga,	8 300	
Rotterdam,	32 87	21
Stettin,	3 96	
Stockholm,		
St. Petersburg,	290 cks.	
Dyestuffs (otherwise undescribed)		
Amsterdam,	2 cs.	
Hamburg,	4 cks.	
Rotterdam,	5 cks. 3 cs. 1 dr. 24 bgs.	
Rouen,	1 cs.	
St. Petersburg,	56 cks.	
Manure—		
Hamburg,	306 bgs.	
Rotterdam,	30 t.	
Stettin,	461 bgs.	

Pitch—		
Antwerp,	473 t.	
Tar—		
Christiania,	5 cks.	
Genoa,	8	
Hamburg,	8	
Stavanger,	3	
Rotterdam,	7	
Turpentine—		
Stettin,	15 cks.	

GLASGOW.

Week ending June 3rd.

Ammonium Carbonate—		
Christiania,	3 cks. 13 kgs.	
Alkali—		
Little Bay,		
Copper Sulphate—		
Nantes,	20 t. 12½ c.	
Copperas—		
Karachi,	15 t. 7½ c.	
Epsom Salts—		
Calcutta,	4 t. 15¼ c.	
Karachi,	5	
Glycerine—		
Rouen,	7 t. 5 c.	
Litharge—		
Karachi,	31¼ c.	
Muriatic Acid—		
Karachi,	21 t. 3 c.	
Naphtha—		
Rouen,	90 cks.	
Potassium Prussiate—		
New York,	29 c.	
Potassium Bichromate—		
Odessa,	14 c.	
Rotterdam,	34 cks.	
Karachi,	2 t. 12½ c.	
Bergen,	1 ck.	
Christiania,	1	
New York,	208	
Rouen,	17 t. 15¾	
Marseilles,	1 3¼	
Pitch—		
Gothenburg,	232 t. 17 c.	
Amsterdam,	250	
Barbadoes,	131	
Paraffin Wax—		
Nantes,	2420 lbs.	
Sydney,	203 c.	
Sulphuric Acid—		
Bombay,	225 c.	
Sodium Bichromate—		
Karachi,	1 t. 19¼ c.	
Salt—		
Brisbane,	163 t.	
Tar—		
Karachi,		
Little Bay,		

GOOLE.

Week ending May 2

Benzole—		
Antwerp,	52 cks.	
Rotterdam,	25 18 drms	
Bleaching Preparation—		
Antwerp,	37 cks.	
Coal Products—		
Ghent,	2 cs.	
Rotterdam,	30 cks.	
Chemicals (otherwise un-		
Rotterdam,	5 cks.	
Rouen,	50 pks.	
Ghent,	41	
Dyestuffs (otherwise un-		
Boulogne,	5 cks.	
Ghent,	1 3 drms	
Rotterdam,	1	
"	220 bgs.	
Hamburg,	66	
Manure—		
Rotterdam,	296 bgs.	
Pitch—		
Antwerp,	98 t.	

GRIMSBY.

Week ending May 2

Coal Products—		
Dieppe,	87 cks.	
Chemicals (otherwise un-		
Dieppe,	4 cs. 1 ck.	
Hamburg,	10	
Rotterdam,	26	

PRICES CURRENT.

WEDNESDAY, JUNE 11, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

Values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
ic, 25 % and 40 %	per cwt.	7/-	& 12/6
Glacial	"	65/-	
mic, S.G., 2000°	"	0	12 9
omic 82 %	nett per lb.	0	0 6½
oric	"	0	0 3¾
atic (Tower Salts), 30° Tw.	per bottle	0	0 8
(Cylinder), 30° Tw.	"	0	2 11
ic 80° Tw.	per lb.	0	0 2
ous	"	0	0 1¾
lic	nett	0	0 3¾
ic	"	0	1 1½
phuric (fuming 50 %)	per ton	15	10 0
" (monohydrate)	"	5	10 0
" (Pyrites, 168°)	"	3	2 6
" (150°)	"	1	4 6
" (free from arsenic, 140/145°)	"	1	7 6
phurous (solution)	"	2	15 0
nic (pure)	per lb.	0	1 0½
taric	"	0	1 3
ic, white powdered	per ton	13	0 0
(loose lump)	"	4	17 6
ina Sulphate (pure)	"	5	0 0
" (medium qualities)	"	4	10 0
inium	per lb.	0	15 0
onia, 880=28°	per lb.	0	0 3
" =24°	"	0	0 1¾
Carbonate	nett	0	0 3½
Muriate	per ton	23	0 0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	& 35/-
Nitrate	per ton	40	0 0
Phosphate	per lb.	0	0 10½
Sulphate (grey), London	per ton	11	6 3
" (grey), Hull	"	11	5 0
ne Oil (pure)	per lb.	0	0 10½
ne Salt	"	0	0 9
mony	per ton	75	0 0
" (tartar emetic)	per lb.	0	1 1
" (golden sulphide)	"	0	0 10
um Chloride	per ton	8	5 0
" Carbonate (native)	"	3	12 6
" Sulphate (native levigated)	"	45/-	to 75/-
ching Powder, 35 %	"	4	17 6
" Liquor, 7 %	"	2	10 0
phide of Carbon	"	13	0 0
mium Acetate (crystal	per lb.	0	0 6
um Chloride	per ton	2	2 6
a Clay (at Runcorn) in bulk	"	17/6	to 35/-
Tar Dyes:—			
zarine (artificial) 20 %	per lb.	0	0 9
genta	"	0	0 3 9
Tar Products			
thracene, 30 % A, f.o.b. London	per unit per cwt.	0	1 5
nzol, 90 % nominal	per gallon	0	3 10
" 50/90	"	0	2 10
rbolic Acid (crystallised 35°)	per lb.	0	0 7½
" (crude 60°)	per gallon	0	2 2
osote (ordinary)	"	0	0 2½
" (filtered for Lucigen light)	"	0	0 3
ide Naphtha 30 % @ 120° C.	"	0	1 4
ase Oils, 22° Tw.	per ton	3	0 0
ch, f.o.b. Liverpool or Garston	"	1	8 0
vent Naphtha, 90 % at 160°	per gallon	0	1 9
-oven Oils (crude)	"	0	0 2½
er (Chili Bars)	per ton	58	5 0
Sulphate	"	24	10 0
Oxide (copper scales)	"	57	10 0
rine (crude)	"	30	0 0
" (distilled S.G. 1250°)	"	60	0 0
e	nett, per oz.	0	0 9
Sulphate (copperas)	per ton	1	10 0
Sulphide (antimony slag)	"	2	0 0
(sheet) for cash	"	14	10 0
Litharge Flake (ex ship)	"	15	10 0
Acetate (white)	"	24	0 0
" (brown)	"	18	0 0
Carbonate (white lead) pure	"	19	0 0
Nitrate	"	22	0 0

	£	s.	d.
Lime, Acetate (brown)	"	7	10 0
" (grey)	per ton	13	0 0
Magnesium (ribbon and wire)	per oz.	0	2 3
" Chloride (ex ship)	per ton	2	5 0
" Carbonate	per cwt.	1	17 6
" Hydrate	"	0	10 0
" Sulphate (Epsom Salts)	per ton	3	0 0
Manganese, Sulphate	"	17	10 0
" Borate (1st and 2nd)	per cwt.	60/-	& 42/6
" Ore, 70 %	per ton	4	10 0
Methylated Spirit, 61° O.P.	per gallon	0	2 2
Naphtha (Wood), Solvent	"	0	3 11
" Miscible, 60° O.P.	"	0	4 4½
Oils:—			
Cotton-seed	per ton	22	10 0
Linseed	"	26	0 0
Lubricating, Scotch, 890°—895°	"	7	5 0
Petroleum, Russian	per gallon	0	0 5½
" American	"	0	0 5½
Potassium (metal)	per oz.	0	3 10
" Bichromate	per lb.	0	0 4
" Carbonate, 90% (ex ship)	per ton	19	10 0
" Chlorate	per lb.	0	0 4½
" Cyanide, 98%	"	0	2 0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10 0
" (Caustic Potash) 75/80 %	"	21	10 0
" (Caustic Potash) 70/75 %	"	20	15 0
" Nitrate (refined)	per cwt.	1	2 6
" Permanganate	"	4	2 6
" Prussiate Yellow	per lb.	0	0 9½
" Sulphate, 90 %	per ton	9	10 0
" Muriate, 80 %	"	7	15 0
Silver (metal)	per oz.	0	4 0½
" Nitrate	"	0	2 9
Sodium (metal)	per lb.	0	4 0
" Carb. (refined Soda-ash) 48 %	per ton	6	2 6
" (Caustic Soda-ash) 48 %	"	5	2 6
" (Carb. Soda-ash) 48 %	"	5	7 6
" (Carb. Soda-ash) 58 %	"	6	10 0
" (Soda Crystals)	"	2	17 6
" Acetate (ex-ship)	"	16	0 0
" Arseniate, 45 %	"	11	0 0
" Chlorate	per lb.	0	0 6½
" Borate (Borax)	nett, per ton	29	0 0
" Bichromate	per lb.	0	0 3
" Hydrate (77 % Caustic Soda) (f.o.b.)	per ton	9	15 0
" (74 % Caustic Soda)	"	9	0 0
" (70 % Caustic Soda)	"	8	5 0
" (60 % Caustic Soda, white) (f.o.b.)	"	7	5 0
" (60 % Caustic Soda, cream)	"	7	2 6
" Bicarbonate	"	5	15 0
" Hyposulphite	"	5	10 0
" Manganate, 25%	"	9	0 0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8 0
" Nitrite, 98 %	per ton	28	0 0
" Phosphate	"	15	15 0
" Prussiate	per lb.	0	0 7½
" Silicate (glass)	per ton	5	7 6
" (liquid, 100° Tw.)	"	3	17 6
" Stannate, 40 %	per cwt.	2	2 6
" Sulphate (Salt-cake)	per ton	1	7 6
" (Glauber's Salts)	"	1	10 0
" Sulphide	"	7	15 0
" Sulphite	"	5	5 0
Strontium Hydrate, 98 %	"	8	0 0
Sulphocyanide Ammonium, 95 %	per lb.	0	0 7½
" Barium, 95 %	"	0	0 5½
" Potassium	"	0	0 8
Sulphur (Flowers)	per ton	7	10 0
" (Roll Brimstone)	"	6	0 0
" Brimstone: Best Quality	"	4	7 6
Superphosphate of Lime (26 %)	"	2	12 6
Tallow	"	25	10 0
Tin (English Ingots)	"	100	0 0
" Crystals	per lb.	0	0 6½
Zinc (Spelter)	per ton	23	0 0
" Chloride (solution, 96° Tw.	"	6	0 0

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning**.

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc., bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

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SACCHARINE.

THIS now famous substitute for sugar is only ten years old, been discovered a decade since by Mr. Fahlberg, a Neuchâtel chemist. It is extracted by a rather protracted process from formed in the dry distillation of coal. In a pure condition it is an amorphous powder, the sweetening capacity of which is three times that of the finest refined sugar. When the discovery was announced it was naturally received with incredulity by persons who regarded it as one of those fictions in which the United States is so fruitful. When, however, through the publication of the process it was possible to produce saccharine in any laboratory, the fact of its invention had to be admitted, but it was believed that the product was of only value as a pharmaceutical preparation. The fallacy of this was speedily demonstrated, for, favoured by its comparative cheapness and some other circumstances, it soon acquired an important place in industrial life. It readily found employment in the manufacture of preserves, sweets, chocolate, liqueurs, and even in the production of wine and beer, in the place of sugar which till then had been exclusively employed. It was only natural that the Fahlberg discovery should stimulate other chemists to fresh experiments in the same field. Among the competing articles arose the so-called methyl saccharine patented by the proprietors of the well-known tar manufactory at Ludwigshafen-on-Rhine.

The growing popularity of saccharine was the means of attracting the attention of a number of governments, who were mainly concerned with the question as to the influence the new product would have upon the revenue. Several authorities also affirmed that the use of saccharine was not altogether conducive to health. In this relation the experiments of a number of scientists, undertaken at the request of a Comité Consultatif d'hygiène, of Paris, are of much importance. It was established that saccharine restrained the assimilative action of the digestive organs of starch and albuminous-containing foods taken at the same time, in consequence of its antiseptic properties, and that it was not a food stuff, as after being eaten it underwent no alteration and was expelled from the system in its original condition.

In view of these circumstances, the Dutch delegates at the International Congress for the Abolition of Sugar Bounties, held in Amsterdam in 1888, were induced to recommend the adoption of a common action on the part of the governments against saccharine. This has, however, been jointly accomplished, but a number of governments have since adopted measures of more or less severity with the object of restricting the consumption of saccharine in place of sugar. In England, in which country an act had been passed prohibiting the employment of saccharine in the production of excisable articles, beer in particular, the Portuguese Government was the first to adopt decisive measures. In a royal decree issued on the 9th of August, 1888, the importation into Portugal of saccharine-containing products was entirely prohibited, except for medical purposes, for which special permission had to be obtained on each occasion. The importation of saccharine into France and Spain was prohibited by a decree of the President of the Republic dated the 1st of December, 1888. In a decree dated the 3rd of April 1889 the Spanish Government not only prohibited the importation of saccharine into Spain, but also made its employment in food stuffs as a substitute for sugar a penal offence. In Belgium, the law of the 21st of March 1889, imposed an entrance duty of 140 francs per kilo. on saccharine on all articles containing down to ½ per cent. saccharine. In France saccharine has for long had to pay an ad valorem duty of 5 per cent. as a drug, but it is probable that the long-entertained intention to impose a duty of 60 florins per kilo, will be carried into effect.

AUTOMATIC GAS RETORTS.

Ordinary process of gas manufacture the coal to be carbonised is fed into horizontal retorts at one end, the red-hot coke being drawn out from the other end. This entails severe manual labour and is attended by other disadvantages in gas-making. The principal evils, especially those affecting the workmen, have been, to a great extent, mitigated by what are known as mechanical stokers and contrivances, but these have by no means come into general use. From the earliest times of gas-making it has been seen that if the principle of gravitation could be utilised, the severity of the labour of charging and discharging the retorts would be greatly reduced, and an important economy in gas manufacture would be effected. To this Clegg, one of our earliest gas engineers, proposed, in 1804, to set retorts at a considerable angle with the horizon, so as to charge them quickly, and with a minimum of manual labour. He followed in the same direction, but without success, the proper angle not having been hit upon, nor proper means taken to insure the even flow of the coal evenly over the bottom of the retort. Mr. Coze, a French gas engineer, has, however, been the first to succeed in applying the principle of gravitation successfully into practice. He has been enabled to do so by adopting the exact angle of slope at which coal will rest when delivered into the retort, and at which it will slide out upon being subjected to the slightest disturbance. His system has been in use for some time past with every success at a number of works in France, and has been visited and favourably reported upon by English gas engineers, who have further testified to the great economy insured by the system.

Mr. Coze's system was soon introduced into this country, and a full set of retorts has been put up at the Brentford Gasworks. At all points the charging apparatus and the general arrangements, however, proved to be somewhat cumbersome, and the details were not so well adapted to lend themselves successfully to English gas-making. The system has, therefore, been adapted to the requirements of this country by Messrs. Morris and Van Vestrout, two English gas engineers, and a full setting of retorts on their system has also been put up at the Brentford works. In this system the retorts are set at an angle of about 30 deg. with the horizon, and are charged by means of a movable shoot, which is made telescopic so as to enable it to reach each tier of retorts. At the lower end of the shoot is an adjustable guide, by means of which the velocity with which the coal enters the retort is controlled. If the coal is charged at too high a velocity it falls to the bottom of the inclined retort, if at too low a velocity it lodges in the upper part of the retort. The guide, however, can be adjusted to the exact slope required, and this, combined with the angle of the retort, causes the charge of coal to be evenly distributed over the bottom of the retort. The coke slips out from the lower end of the inclined retort at the slightest touch, so that the system is practically automatic. In order to test the system a single retort was first set up at Southall, and this was inspected and its working reported upon by Mr. Perry F. Nursey, C.E., a short time since. In his report Mr. Nursey says:—

"The working retort was of the ordinary U section, 20 ft. long by 12 in. wide and 13 in. deep, and was set at an angle of about 30° with the horizon. I first saw this retort drawn. The coke in it was laid in a perfectly even bed from end to end, and it came out readily on being loosened with a light slice. I then saw the retort charged with 6 cwt. of Pelaw Main coal, the usual charge being 6 cwt. for each retort; but, all the irregularities being filled up, a heavier charge could be used. The retort was charged in the remarkably short time of 4½ seconds."

The advantages of the new system may be summed up as obviating the tedious work of retort charging and drawing; economising the use of skilled labour not being required; saving the wear and tear of the retorts, and effecting an economy in construction. Upon this latter point it may be observed that a retort-house for the new system need be only half the width of one on the old system for the same number of retorts. Moreover, in converting an existing retort-house to the new system, two benches of retorts can be erected in the place of the one single bench, as stage work and stage coal are dispensed with.

Another important advantage is that, skilled labour being saved, the new system will give gas companies great command over the carbonizing department of their works in the event of future difficulties. The system of inclined retorts is being adopted, not only by the Brentford Gas Company, but by the South Metropolitan Gas Company, the Gas Light and Coke Company, and by the local provincial gas companies.

A demonstration of the charging and drawing of a full setting of retorts on the Morris and Van Vestrout system at the Southall works of the Brentford Gas Company took place a few days since in the presence of a number of gas engineers and other gentlemen. In order to make the test comparative, a bench of seven 20 ft.-through retorts of the ordinary horizontal system was first drawn and afterwards

charged by ordinary trained stokers. There were three men at each end of the setting, and the time occupied in drawing the coke was 4½ minutes per retort. The time occupied in charging each retort with 6 cwt. of coal was 50 seconds. In the case of the inclined system there was also a setting of seven through retorts of the same length and section as in the previous case, the work here being performed not by regularly trained stokers, but by yardmen. With one man at each end of the setting, the drawing of the red-hot coke from each retort was effected in 1¼ minutes, and the charging of each with 6 cwt. of coal in 15 seconds, and this notwithstanding that the new system is not yet complete in all its working details, more being left to be done by manual labour than will be the case when the coaling arrangements have been completed.

ADULTERATION IN THE UNITED STATES.

REPORTS of officials charged with the duty of food inspection and analysis almost invariably show, says *Bradstreet's*, that the exercise of such functions under governmental authority continues to be a necessity. The report recently published of the State Dairy and Food Commissioner of Minnesota shows that adulteration is still practised to a considerable extent in the territory within his jurisdiction. The Commissioner found a considerable amount of adulteration in such articles as lard, vinegar, and baking powder. Cotton-seed oil is used as an adulterant of lard. In a large number of instances baking powders are adulterated with alum, and coloured low wine vinegar is palmed off as cider vinegar. The report of the analyst in charge of the Minneapolis laboratory showed a large amount of adulteration in such articles as coffee, ground mustard, vinegar, and milk. Of the samples examined by him, coffee showed the largest amount of adulteration, 100 per cent.; ground mustard came next, with 82 per cent.; then baking powders, with 47 per cent. of adulteration, and milk, with 42 per cent. It should be remarked, by the way, that the samples of coffee and mustard examined were few in number. It is encouraging to know, however, that according to the Commissioner's observations adulteration in food products is of less frequent occurrence than it has been.

TRUSTS IN AMERICA.

HOW PRICES ARE KEPT HIGH.

MR. DONALD, in the *Contemporary Review*, has a remarkable article on American Trusts. In the course of it he says:—Another powerful combination is the great Sugar Trust. Sugar presented an excellent opportunity for the trust makers. It is protected by a duty which averages about eighty per cent., and a bounty is paid by the Government on all sugar exported. Sugar is one of the necessities of life, and is used in every household. The sugar refiners discovered in 1887 that too much sugar was being manufactured, so they consolidated to reduce the supply and raise the price. The real value of the property "trusted" was 15,000,000 dols., but "trust" certificates were issued which "watered" it up to 60,000,000 dols. The trust first depressed the price of raw sugar, and then raised the price of cut loaf and crushed sugar by one and a-half cents per lb., and granulated sugar by one cent per lb. A rise of one cent per lb. on the sugar consumed in the United States would mean an increased profit of 30,000,000 dols. Strong opposition has been made to this trust, but it still holds its own. English people have nothing to complain of in this matter. They ought to appreciate the friendly attitude of the United States Government, as it helps to pay for their sugar.

When the Steel Combination pressed on the western plough manufacturers they in turn organised a trust, and squeezed the farmers, who are now contemplating a similar course to resist the pressure. A Steel Rail Combination has been in existence since 1877. It is not formed on trust lines, but serves the same purpose. The "iron lords" and "steel lords" are bound together by the closest ties of self-interest in the American Iron and Steel Association. The Association keeps the prices as high as the tariff will allow, and does all it can by the circulation of pamphlets, by employing "lobbyists," and by resorting to other well-known methods, to maintain a feeling in favour of the continuance of a protective tariff on iron and steel.

The principal manufacturers of American whisky got up "pools" now and then between 1878 and 1887 to arrange prices. The "pools" were not quite so successful as the distillers desired, and in 1887 they discovered that the hitch arose because there was too much whisky. This discovery was worthy of temperance reformers, but the object of the distillers was not to help forward the prohibition movement or the temperance cause. Nor was their ultimate aim the limitation of whisky-drinking. They only wanted to temporarily limit the supply. They organised the Western Distillers and Cattle Feeders' Trust—a

compound sort of trust. On its formation seventy distillers joined it, and the price of whisky was at once raised from 30 to 40 per cent. Fifty-seven distilleries were closed, and the remaining thirteen left to make profits for the time being for all the shareholders. The owners of the distilleries which were lying idle, therefore, did not lose anything. The wages of the men still left at work were cut down from 10 to 20 per cent. But the trust had been too grasping, and competition began to reappear. New distilleries were opened, and as these had to be crushed or absorbed, down went the price of whisky—lower than it had ever been before—until they succumbed. The trust now controls more than half the distilleries in the country. It also fixes the price for "mash" used for feeding cattle—hence its double-barrelled name. The duty on alcohol is 171·85 per cent., and the duty on spirits distilled from grain—such as the trust makes—rises to 396·43 per cent.

Selected Correspondence.

SULPHATES IN NITRIC ACID.

By JAMES H. HUXLEY in *Chemical News*.

I have recently been a good deal perplexed by finding sulphuric acid in steel and pig iron, in which I knew it was not likely to be present, and on careful examination of the acids employed for solution, I found that the nitric acid pur., 1·42 s. g., contained a considerable percentage of sulphuric acid. I have used this same make of acid for many years without having any reason to suspect its purity, though, only occasionally, for sulphur estimations. The makers have been communicated with by the persons who supply me, and I understand their explanation is that the acid is quite pure as it leaves their factory, and that the sulphuric acid is derived from the bottles in which it is sent out. These are Winchesters of greenish colour, and new ones are always used. The acid of which I am speaking is part of a batch which has been in bottle since last November, and the makers are not surprised at its having picked up sulphuric acid from the bottles. No doubt there is sulphate of soda in the material of which the glass is made, but I find that I can obtain a pure re-distilled nitric acid in bluish-coloured Winchesters which is perfectly free from sulphuric acid, though it has been in bottle about the same length of time as the other. I don't know whether any of your readers have had similar trouble, but I think it may be of value to warn users of so-called pure nitric acid of the necessity of frequently testing it for sulphates, and I should be glad to have information as to the action of nitric acid upon glass bottles in which it is stored, as the present state of things seems to be rather anomalous; viz., that greenish glass Winchesters sometimes contain sulphates capable of being dissolved out by nitric acid, but that bluish glass Winchesters have not been known to contaminate nitric acid in this way; at least, so far as I can ascertain.

WHAT IS CAST STEEL?

By SIR HENRY BESSEMER in *The Engineer*.

Your correspondent, "Crucible," writing under the above heading, asks, "Will Sir Henry kindly state, for the benefit of the trade generally, the present meaning of the term 'cast steel'?"

In reply I would remark that there are known in commerce several different kinds of steel, each bearing a name which more or less accurately indicates its mode of manufacture or its specific character. Thus we have blister steel, shear steel, double shear, German or natural steel, and puddled steel, in all of which the bars are produced by the union or welding together of solid pieces, a process which gives to them a more or less laminated structure, and consequently an admixture of scoria or other extraneous matters between the different layers of which the bar is composed.

Huntsman's great invention consisted simply in fusing such imperfect steel bars in a crucible, and, while in a fluid state, casting the molten steel into an ingot, whereby the laminated character of the steel bar is lost, and its mechanically mixed scoria is separated from it. The cast ingot so produced forms a homogeneous mass, which is crystalline in structure and perfectly free from lamination, admixture with scoria, or other extraneous solid matter, all of which advantages are derived from the fluid condition of the metal, and its being cast or run into a mould, and hence such steel is distinguished by the very correct and obvious name of cast steel. There is in this great transformation no particular virtue in the crucible itself, which is only a means to an end; that end, and all the advantages flowing from it, is simply derived from the fluidity of the metal, and the casting therefrom of a homogeneous mass.

Your correspondent very naively remarks that "it would simplify matters if the generic titles of 'crucible' and 'Bessemer' were kept separate, and not allowed to become confused in any way by the connection of the term cast steel." However much it may be desired by some persons to draw a hard-and-fast line that shall separate Bessemer steel from crucible steel, it is impossible to do so, for they are indissolubly united in the same category by one great distinctive character

which is common to each process, viz., the fluid condition products, and the formation of this fluid into an ingot or homogeneous mass by the act of casting. Nor is this all, for Bessemer steel, crucible steel, may be either mild or highly carburized at the manufacturer; it may, like crucible steel, be alloyed due process with any other metal, and, like crucible steel, it may be good or bad quality, dependent chiefly on the quality of material put into the crucible or the converter.

And further, it may be said that Bessemer steel, like crucible steel, is crystalline in structure, and not laminated; it breaks like steel with a beautiful conchoidal fracture, and may, like fluid steel, be made into a vast variety of useful articles by pouring into suitable moulds; and, in fact, Bessemer steel is identical with crucible steel in its molecular structure, its chemical constitution, and in its physical properties, and is in all respects as true cast steel as that made in the crucible.

INDIAN INDUSTRIAL PRODUCTS.

The following information respecting raw cotton, dyes and materials, and lac are extracted from a memorandum on inland trade compiled in the Revenue and Agricultural Department of the Government of India, and which has recently been issued by the Government central printing office at Simla:—

COTTON (RAW).—Though the production and exportation of cotton have never attained the dimensions which they reached in 1850, when the cotton famine due to the American civil war raised the value of exports to 37 millions sterling, it is still one of the great staples of the Indian export trade.

Cotton enters into the agriculture of almost every part of India. Its cultivation is concentrated in the region, embracing roughly 100 square miles, occupied by the basaltic formation known as the Deccan trap, the decomposition of which has created a commonly designated black cotton soil. The region comprises the provinces of Bombay and Berar, and the Western half of the India States, the Nizam's dominions and the Central Provinces. Within it, and particularly in the Bombay Presidency and the Nizam's dominions, several exotic and hybrid varieties of cotton are grown; it occupies the largest share to the export trade, and it still offers an important field for the expansion and improvement of cotton cultivation.

The area under cotton, as well as the out-turn in any year, is subject to large fluctuations. It is a crop easily affected by unseasonable rains, and the extent of the sowing depends upon the season being favourable, and to a less extent upon rotation. Including the area which it is grown as a mixed crop (a common practice in agriculture), the present normal acreage under cotton is estimated at 14 million acres, and the out-turn of 129 lakhs of maunds.

The subjoined figures gave the details of this estimate; but in cases where the native States and other tracts for which reliable statistics are not available, they must be accepted as open to wide correction.

(00000 omitted.)

Block.	Normal Area.	Normal Out-turn Cleaned Cotton.	A E
	Acres.	Mds.	
Bombay	52	51	
Berar	20	14	
North-Western Provinces and Oudh	17	16	
Madras	17	10	
Nizam's Territory	10	7	
Rajputana and Central India States	8	11	
Punjab	8	13	
Central Provinces	5	3	
Bengal	2	2	
Sindh	1	2	
Total	140	129	

Cotton is sown at the commencement of the rains and picked from October to December. In Southern India there is a second crop of less commercial importance, known as the late crop, which is sown in September and is picked from February to April. A fair yield of the whole was obtained from late crops in 1888. The out-turn of crops of that year was not above middling, though superior and, owing to the early cessation of the rains and the absence of untimely falls during the ripening and picking season, better than in 1887.

*Lakh of maunds=73,475 cwt.

anticipations founded on a decreased acreage. The inland trade of the year stands at 89 lakhs of maunds, showing an increase of 6 per cent. As might be expected from its proximity to the great cotton-growing area, Bombay town took the lion's share of the exports, viz., 64 lakhs of maunds.

Among cotton producers the Bombay Presidency takes foremost rank. Of the five million acres which it cultivates with cotton, about one-half belong to native States within its boundaries. The late crop (grown principally in Khandesh) of the year 1888-89, equalled that of 1887; the early crop was $3\frac{1}{2}$ per cent. below it. Exports to the port-town consequently show a fall from 34 to 30 lakhs of maunds, but this was more than made up by Berar, which stands next in importance to the Bombay Presidency as a cotton producer. An exceptionally favourable yield was secured in this province, and the despatches to Bombay town rose from 9 to 18 lakhs of maunds.

The Central Provinces also had a good crop, and exhibit an increase from 91,000 maunds to over 2 lakhs of maunds.

In Northern India the seasons have been favourable to cotton for the past two or three years. Fears were entertained that the Punjab out-turn would prove worse than the poor crop of 1887; in the end these fears were not realised, the area being 17 per cent. greater, but the yield does not appear to have been proportionately favourable, as the total exports show a falling off of 1 lakh of maunds.

A contrary result is to be inferred from the export figures for the North-Western Provinces and Oudh, where, in spite of a decrease of 8 per cent. in area, the exports remained at the level of the previous year (11½ lakhs of maunds).

DYES AND TANS comprise indigo, myrabolams, cutch, turmeric, aniline dyes, and "others"; the first is by far the most important and stands at 323 lakhs of rupees* in a total trade in dyes and tans valued at 442 lakhs of rupees.

Bengal, the North-Western Provinces and Oudh, and Madras, are the principal sources of commercial indigo, and their combined exports during the year amounted to 289½ lakhs of rupees, viz.: Bengal, 187½ lakhs of rupees; North-Western Provinces and Oudh, 73½ lakhs of rupees; and Madras, 28½ lakhs of rupees. It is also grown rather extensively in the Punjab, but chiefly for local consumption. Elsewhere its cultivation is not unknown, but it is unimportant.

Indigo-manufacture in Bengal has a long history marked by many vicissitudes of fortune; but notwithstanding some serious checks, and in later years the competition of aniline and other dyes, it continues to hold its place as one of the great industries of the province. The total area under indigo in Bengal is estimated to be 588,000 acres, and the manufacture is in the hands of European capitalists. The season was fairly prosperous and the exports amounted to 90,616 maunds.

In the North-Western Provinces and Oudh indigo is largely cultivated in the districts to the east of Allahabad, and in the central and western half of the tract lying between the Ganges and Jumna rivers, where canal irrigation has led to a considerable extension of the acreage under this crop. The total area now under indigo in the North-Western Provinces and Oudh averages about 337,000 acres. Unlike Bengal, the manufacture is, except in the eastern districts adjacent to Berar, in the hands of natives. The crop of 1888-89 was not a good one owing to heavy and frequent rainfall, and exports fell from 43,000 maunds in 1887-88 to 40,000 maunds.

Madras indigo is commercially less valuable than that of Northern India; its cultivation is confined to the Northern Circars, but is extending, and the total area is between 400,000 and 500,000 acres. The exports were 23,866 maunds against 26,000 maunds in the preceding year.

The indigo area in Punjab is returned as 138,000, of which 82,000 are comprised in the districts of Multan, Muzaffargarh, and Dera Ghazi Khan, where the indigo exported from the province is manufactured. The exports go to Sindh and Karachi. During 1888-89 amounted to 14,085 maunds, valued at 12'39 lakhs of rupees.

A noticeable peculiarity of indigo culture is the extent to which the cultivators of Behar depend on the North-Western Provinces and Oudh and the Punjab for seed. The exports of seed from these provinces average 1½ lakhs of maunds a year.

Myrabolams, the fruit of a species of *Terminalia*, are exported principally from the forests of the Central Provinces and Bombay to Bombay town. During the year the exports of the Central Provinces amounted to 5'31 lakhs of rupees in value, and of the Bombay Presidency to 3'34 lakhs of rupees. With the opening of the railway from Nagpur to Bengal the trade may be expected to increase rapidly.

The Indian trade in cutch is insignificant compared with that of Burma, and the total value was under 8 lakhs of rupees. Of this about 2½ lakhs of rupees is the value of cutch imported through Calcutta and exports from Burma. Punjab and Bombay derive their supplies from the North-Western Provinces and Oudh.

Turmeric, the roasted root-stock of *Curcuma longa*, is a condiment as well as a dye, and is extensively used by natives and Anglo-Indians for this purpose. The principal localities of production are Bengal, Madras, and the North-Western Provinces and Oudh, 6 lakhs of rupees went to port-towns, 7½ lakhs of rupees to British provinces, and 2 lakhs of rupees to native States. A larger quantity went to the Punjab (value, 2'34 lakhs of rupees) than to any other province, which is perhaps to be partly accounted for by the fact that yellow is a favourite dye of the Sikh nation.

The growing popularity of aniline dyes is illustrated by the general distribution of the imports by sea among the internal trade blocks. Assam and Sindh are the only provinces which do not appear to import them. The Nizam's territory, Mysore, and Berar take them to a very moderate extent, but these provinces probably get the bulk of their supplies by road.

LAC.—Of the three commercial products of the insects (*Coccus lacca*) which causes the secretion of this resin—viz., stick-lac, shell-lac, and lac-dye, the trade in the two former only is separately recorded. Lac-dye, which is obtained from the washing of stick-lac, and is a colouring matter derived from the female insect embedded in the resinous secretion, has, since the introduction of chemical dyes, almost disappeared as an article of export. Stick-lac is the crude product encrusting the twigs on which it is formed, but has, it is to be feared, been confounded in the returns in some instances, notably in the case of Assam and Punjab, with the manufactured article. Shell-lac is the pure resin extracted from stick-lac, which is pounded and exposed to heat for the purpose. *Coccus lacca* has a wide distribution, and affects various trees, but is collected principally from two or three species of fig and *Zizyphus* (ver. Ber) and *Butea frondosa* (ver. Dhak and Palas). The jungles of the Central Provinces—Chota, Nagpore, Rewah (one of the Central India States), Mirzapore, and Assam are the chief sources of supply. In Assam the insect is regularly cultivated on two varieties of fig. It is also fairly abundant in parts of the Punjab. The inland trade of the year is valued at 101 lakhs of rupees. Calcutta received 17 lakhs of rupees from Bengal, 32 lakhs of rupees from the North-Western Provinces and Oudh, and 11 lakhs of rupees from Assam. The North-Western Provinces collect the produce of the Central Provinces, Punjab, and Rewah for exportation, and a portion of the consignments from Bengal to Calcutta consists of re-exports of arrivals from Assam.

SULPHITE IN ENGLAND.

CRITICISM OF A FOREIGN PAPERMAKER.

A FOREIGNER'S opinion upon ourselves is sometimes as amusing to us as a comedy, yet we are so extremely insular in our ways that criticism has about as much effect upon us as water upon a duck's back. Yet, when an intelligent foreign papermaker criticises our method of using a foreign product with which he is familiar, the criticism may be well worth attention. We, therefore summarise the remarks of a foreign expert upon English paper manufacture and sulphite pulp. Our visitor plainly said that our papermakers do not make the same success of sulphite pulp as their brethren on the continent, and suggests that it must result from insufficient knowledge and faulty treatment of the fibre; "for," said he, "it appears to me that some of your papermakers overlook the fact that sulphite is a fibre, which replaces rags or esparto, and on no account should it be used simply for filling. China clay or cotton waste will do that well enough, and to use sulphite fibre for the latter purpose, even in superior papers, is a mistake."

Continued our candid visitor, "I was struck with surprise to learn that English papermakers are always willing to buy sulphite—if only cheap enough. They quite overlook the fact that such cheap lines may really be very dear, because they cannot be worked as a substitute for rags or esparto, being either too weak in fibre, or too costly in price, considering the quality. It strikes me as peculiarly strange, when papermakers do not care to buy the finest and best obtainable grades of sulphite. I myself have heard them say, 'Yes, this is a fine fibre, but too dear for me.'"

"Wages and coal on the Continent are dearer now than in Great Britain," said our Teutonic visitor, "and inland carriage also, yet foreign papers continue to come into this market largely, and to undersell you English. Why? Because the German papermaker neither uses low grade rags, jute bagging, or esparto. Why do not your English papermakers recognise wherein lies the advantage of the foreigners? It is this. Sulphite pulp is practically paper which only needs very little manipulation—and the foreign maker gives it correctly. From what I can understand, many of your English makers continue to use the same methods which their forefathers employed half-a-century ago. This is my opinion of English paper manufacture, and you may print it if you like, but please do not publish my name or shall get myself—what do you say is the word—disliked."

*1000 = 1,00,000 rupees.

PERMANENT CHEMICAL EXHIBITION.

THE proprietors wish to remind subscribers and their friends generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds.

ASHMORE, BENSON, PEASE AND CO., STOCKTON-ON-TEES.—Sulphate of Ammonia Stills, Green's Patent Scrubber, Gasometers, and Gas Plant generally.

BLACKMAN VENTILATING CO., LONDON.—Fans, Air Propellers, Ventilating Machinery.

GEO. G. BLACKWELL, LIVERPOOL.—Manganese Ores, Bauxite, French Chalk. Importers of minerals of every description.

BRACHER AND CO., WINCANTON.—Automatic Stills, and Patent Mixing Machinery for Dry Paints, Powders, &c.

BRUNNER, MOND AND CO., NORTHWICH.—Bicarbonate of Soda, Soda Ash, Soda Crystals, Muriate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.

BUCKLEY BRICK AND TILE CO., BUCKLEY.—Fireclay ware of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.

CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Driers and Steam Traps (McDougall's Patent).

W. F. CLAY, EDINBURGH.—Scientific Literature—English, French, German, American. Works on Chemistry a speciality.

CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Salt, Benzole, Toluole, Xylole, and Nitro-compounds of all kinds.

J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps and Valves, "Non-rotative Acid Valves," Lead Burning Apparatus.

R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Plant—Blowing Engines, Filter Presses, Sludge Pumps, &c.

DAVIS BROS., MANCHESTER.—Samples of Products from various chemical processes—Coal Distilling, Evaporation of Paper-lyes, Treatment of waste liquors from mills, &c.

R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Plants, Holders, Condensers, Purifiers, &c.

DOULTON AND CO., LAMBETH.—Specimens of Chemical Stoneware, Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.

E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Ozonized Bleached Esparto-Pulp, Ozonised Oil, Ozonized Ammoniated Lime, &c.

GALLOWAYS, LIMITED, MANCHESTER.—Photographs illustrating Boiler factory, and an installation of 1,500-h.p.

GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Sizing Materials, India-rubber Chemicals.

JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters.

JOSEPH KERSHAW AND CO., HOLLINWOOD.—Soaps, Greases, and Varnishes of various kinds to suit all requirements.

C. R. LINDSEY AND CO., CLAYTON.—Lead Salts, (Acetate, Nitrate, etc.) Sulphate of Copper, etc.

CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Carbolic Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants, &c.

MANCHESTER ANILINE CO., MANCHESTER.—Aniline Colours. Samples of Dyed Goods and Miscellaneous Chemicals, both organic and inorganic.

MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhausters, Silent Boiling Jets, Air Compressors, and Acid Lifters.

E. D. MILNES AND BROTHER, BURY.—Dyewoods and Dyewood Extracts. Also samples of dyed fabrics.

MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. Makers of all kinds of heating appliances.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, Recovered Sulphur, etc.

ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawings, illustrating their Gas Compressors and Vacuum Pumps, fitted with Pilkington and Forrest's patent Valves.

J. ROYLE, MANCHESTER.—Steam Reducing Valves.

A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Substitute, Bisulphide of Carbon, Solvent Naphtha, Liquid Ammonia, and Disinfecting Fluids.

WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Pumping Machinery. Speciality, their "Duplex" Pump.

JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feed-water Heater. Makers also of Multiple Effect Still and Water-Softening Apparatus.

THE PURIFICATION OF WATER BY MEANS OF METALLIC IRON.

THE purifying properties of the metal iron and its beneficence in the natural soil are well known.

Dr. Medlock was probably the first who endeavoured the practical use of metallic iron as a purifier of water. He obtained a patent in 1857 for a process in which iron wires or plates were suspended in tanks through which the impure water was to pass. In 1867, Dr. Thomas Spencer brought out a material which he called magnetic carbide, in which iron was the active reagent. Little, however, was accomplished, on a practical scale, previous to the discovery by Professor Gustav Bischof of the material known as spongy iron. The spongy iron is produced by heating hematite ore to a temperature of a little below that of fusion, and thus rendering it porous in form. Dr. Bischof's material has long been utilized in filters, and the spongy iron filter is at the present time second only in its remarkable purifying properties, and in the permanent action during the whole period that the mass of the material is porous.

In supplying the city of Antwerp with water from the River Scheldt it was found necessary to adopt some artificial means for improving the quality of the water. Spongy iron was selected. Three filters were constructed, each pair consisting of an upper basin containing a mixture of spongy iron and gravel, three feet in thickness, and a lower basin containing a bed of river sand two feet thick. The river water was pumped into the upper basin, flowing through the bed of spongy iron on to the sand filter where the oxide of iron was retained. The chemical results and the great improvement in the appearance of the water were all that could be desired, and for two years it seemed that a practical process of purifying foul water on a large scale had been found. After a time, however, as the quantity of water increased in the city, and the filters were required to do more work than they were calculated for, it was found that the mass of spongy iron was caking together and becoming daily less porous. At length it became so serious that it was with the greatest difficulty that sufficient filtered water could be obtained to meet the daily requirements. The spongy iron beds had to be dug over, by manual labour, to loosen the material, and restore, in some degree, its porosity.

In order to overcome this difficulty, Mr. Wm. Anders conducted many experiments, accomplished the desired end by the use of the revolving purifier, wherein, instead of allowing the water to flow downwards through a motionless mass of spongy iron, the purifying material is showered down upon the water, divided particles in a flowing stream of water. The purifier consists of a horizontal cylinder capable of revolving on roller bearings. Attached to the internal periphery of the cylinder is a series of short curved shelves, arranged either in horizontal or diagonal rows at equal distances. A sixth row of curved shelves is replaced by a line of small square plates, which, by means of a screw outside the cylinder, can be set at an angle with the axis of the cylinder. By regulating the angle of these plates the shower of water can be directed back to the inlet end of the purifier, and the flow of water to carry forward the purifying material is increased. Gearing is provided for rotating the cylinder, and outlet pipes are fixed axially at either end. On being started, sufficient metallic iron to fill one-tenth of the cylinder is introduced through the manhole, the iron being in a suitable state of subdivision. The purifier is then filled with water through the sluice-cock, and the apparatus is set in rotation. The effect of rotation is to scour the iron particles and to shower them down through the flowing water. Contrary to expectations, it was found that a contact varying from three and a-half to five minutes was sufficient to effect the purification of the majority of waters. Further, it was found that when used in the revolving purifier spongy iron had a great merit. Any form of waste iron—such as cast iron, boiler punchings, etc., gave equally good chemical results, and were preferable to spongy iron, the irregularity of whose form was a disadvantage with the automatic and continuous renewal of the active surface purifying material by attrition. The theory of the process is as follows:—

The action on the iron in the purifier is one of reduction. The ferrous acid brought by the impure water dissolving a minute quantity of the metal and forming a protosalt of iron. On issuing from the cylinder into the open air this protosalt is gradually converted into the action of the atmospheric oxygen, into ferric hydrate, which is insoluble. It is stated that nascent ferric hydrate destroys the organic matter; but there is no doubt that the coagulation of the ferric hydrate carries down a great proportion of suspended organic matter, and it is obvious that a further process is necessary to remove this portion of the water.

* Abstract of a paper read by Mr. Easton Devonshire before the Institution.

This is accomplished by filtration through 18 inches of sand, whereby the water is freed from its suspended matters. "Sandfilters have been at work at Antwerp for more than five years; they have never been cleaned below the surface, and yet at the present time the water issuing from them contains no free ammonia at all, and less than $\frac{1}{10}$ of a part in a million of albuminoid ammonia; the river water containing on the average $\frac{1}{10}$ of a part in a million of each of these forms of ammonia."

The general results obtained are said to be as follows:—Firstly, all colour is removed from the water. Secondly, oxidisable organic matter as measured by its power of reducing permanganate of potash is reduced in proportions varying from forty-five to ninety per cent., according as the organic matter is principally of vegetable or of animal origin. Thirdly, free ammonia and nitrous acid are entirely removed. Fourthly, albuminoid ammonia is reduced from sixty to ninety per cent. Lastly, micro-organisms are entirely destroyed or removed by this process. Professors Blas, of Louvain; Jonssen, of Liege; Swarts and Van Ermengem, of Ghent, were appointed as a commission to examine and report upon the practical results of actual working by this process. Quarterly reports were made by the commission, giving the results of the weekly analyses. Each of these reports stated that the very impure and dirty water of the river Nethe was transformed by the process of purification into a liquid equal, from a hygienic point of view, to the purest and most healthy spring water.

Legal.

COURT OF APPEAL.

(Before the MASTER of the Rolls and Lords Justices LINDLEY and LOVES.)

THE CAPE COPPER COMPANY (LIMITED) v. COMPTOIR D'ESCOMPTE DE PARIS.

THIS was an appeal by the defendants from an order of the Divisional Court (Mr. Justice Denman and Mr. Justice Charles). The action was brought to recover £600,000., and arose out of the French combination or ring to raise the price of copper. The Société des Métaux had agreed to purchase from all the chief copper companies, including the plaintiff company, all the copper produced for three years, at greatly enhanced prices. The defendants guaranteed the performance of this agreement by the Société des Métaux. The Société des Métaux and the defendants subsequently went into liquidation, and the French ring collapsed. The price of copper accordingly fell considerably, and the plaintiffs brought this action against the liquidator of the Comptoir d'Escompte, upon the guarantee, to recover damages for the loss sustained by them in consequence of the non-performance of the agreement by the Société des Métaux in respect of certain deliveries of copper. The pleadings having been closed in December, 1889, the defendants subsequently applied for leave to add a defence that the agreement was illegal and void according to the English law, as being in restraint of trade, and therefore against public policy. The matter having been referred to the Court from Chambers, the Divisional Court refused to allow the amendment, giving leave, however, to add a defence that the agreement was illegal and void according to French law, and ordering the trial to take place on June 23rd. The defendants appealed.

Counsel having been heard,

The Master of the Rolls said that in this action, involving so large an amount of money, the Divisional Court had, in his opinion, struck too soon. The defendants ought to be allowed to plead that these contracts were avoided by English law. That being so, it would be futile to allow the amendment, and at the same time to fix June 23rd for the trial. They had come to the conclusion that they ought not to fix any day for the trial, but they did not for a moment say that the case must be thrown over the long vacation. If the defendants did not prosecute the commission with due diligence, the plaintiffs could make a further application to the Court. The costs caused by the amendment must be paid by the defendants, and the costs of the appeal must abide the event of the action.

The Lords Justices concurred.

THE MINERAL PALACE OF COLORADO.—The Colorado *Western Manufacturer* states that a mineral palace is to be erected at Pueblo, Col., which will cost about \$250,000. It will be of handsome design, the exterior being a series of square columns and beautifully polished stone. All parts of the building will be made of the products of Colorado's mines, the owners in all the counties in the State having sent in their choicest and richest specimens. In the interior will be seen every variety of mineral production, from stone and coal to pure gold, the value of which will be at least \$750,000. It is intended to be a permanent exhibit. The building will be lighted by 3,000 incandescent electric lights.

Trade Notes.

A LARGE ORDER.—The whole of the five large Galloway boilers supplied by Galloways, Limited, Manchester, which provide all the steam required in the Edinburgh Exhibition, have been purchased by the North British Rubber Co., for their Castle Mills, Edinburgh.

GREAT STOCK OF TOBACCO IN LIVERPOOL.—In the warehouses at the Liverpool Docks there are just now 46,622 hogsheads of tobacco, as against 31,932 in those of London. During the last five months, upwards of 8,000 hogsheads have been received, and upwards of 11,000 have been delivered. The tobacco trade of Liverpool is now greater than that of all the other British ports put together.

ONE WELL THAT SPOUTETH.—We learn from the *Liverpool Journal of Commerce*, that at Pittsburg, a poor little debt-ridden Presbyterian church of Forest-grove, has become rich by a strike of oil in the churchyard. The wells sunk now average an out-put of 1,000 barrels daily, and the royalties will amount to 90,000 dollars a year. The paper from which we call this says, "the deacons are beside themselves with joy." Probably there is more joy in that church over one well that spouteth oil, than over many sinners who repent. We can well believe it. So human!

DISCOVERY OF NICKEL DEPOSITS IN GERMANY.—Deposits of nickel have been very recently discovered near Frankenstein, in Silesia, by Herr Reitsch, a mining engineer. These deposits extend for a length of ten kilometres, and are one kilometre wide, and are found only a few metres from the surface. According to the German newspapers, the mineral is free from copper, antimony, arsenic, etc., and it averages about 5 per cent. of nickel, though in some parts it attains as much as 13 per cent. The discovery has given much satisfaction in Germany, where it is hoped the importation of nickel from New Caledonia will in future be dispensed with, besides which it can be easily smelted on the spot.

GERMANY AND THE MCKINLEY BILL.—VERBUM SAP.—We are not entirely without resources to meet the protectionist movement. Negotiations are at this moment proceeding between the United States and German Governments with the object of obtaining the removal of the prohibition on the import of American meat. It is worth while considering whether the amelioration at least of the McKinley Bill should not be made a condition of the throwing open of the import into this country of American meat. Very powerful interests are connected with the American meat trade, and it may be expected that they would be exerted in favour of ameliorating the American protective duties if it were seen that the removal of the prohibition on porcine products were the result.—*Kuhlrow*.

BRITISH TRADE WITH THE DANUBIAN STATES.—The following letter, referring to the opening of the new railway from the Black Sea port of Bourgas to Yamboli and the new facilities thus offered to English trade with the Danubian States, was received last week at the Manchester Chamber of Commerce:—"Foreign Office, June 12, 1890. Sir,—With reference to the letter from this office of May 31 last, I am directed by the Marquis of Salisbury to acquaint you, for the information of the Manchester Chamber of Commerce, that the line from Yamboli to Bourgas was formally opened on the 26th ult. In announcing this fact to the Secretary of State, her Majesty's agent and Consul-General at Sofia again expresses the hope that some British steamship company will shortly establish direct communication between London and the port of Bourgas, for unless some step in this direction is soon taken he is apprehensive that German imports coming via Hamburg on especially favourable conditions will compete on such advantageous terms with British trade that the latter must suffer considerable loss.—I am, &c., JAMES FERGUSON."

ADULTERATION OF NORMANDY BUTTER.—The British Vice-Consul at Caen, in his last report, says that, in spite of the special laws adopted very recently against the fraudulent practices of the butter dealers and merchants in largely introducing various fatty compounds to mix with the pure butter, this fraud has been, and is still being carried on extensively, and the exporters have, for some time past, been introducing the hitherto excellent Normandy butter to the English market largely adulterated with the compounds. A syndicate of the butter merchants of Northern France has been formed, and they have recently issued an appeal to all the honest butter merchants, to endeavour to avert this disaster to the trade through the decrease of the exportation to foreign markets, attributable to the adulteration of the hitherto pure butter exported. The export of Normandy butter in 1882 to the English markets alone amounted to the value of 89,900,000*fr.*, while in the year 1887 it had fallen to 58,100,000*fr.*, and since the latter year, there has been a still further decrease. The syndicate proposes, as a precautionary measure, that a new law shall be passed to oblige the makers of the compound to give it some colouring matter other than the hue of butter in its unadulterated natural state, so that it will then be impossible to mix it with the pure article without showing some trace of margarine. This adulteration of butter is extensively carried on in Caen.—*Times*.

ESTABLISHMENT OF A COMMERCIAL MUSEUM AT ALENGON.—*Monsieur Officiel du Commerce* announces that the French Minister of Commerce, Industry, and the Colonies, has, by decision of the 11th April, approved the establishment of a commercial museum by the Alengon Chamber of Commerce.

A RUSSIAN EMPLOYERS' LIABILITY BILL.—A Bill is before the Russian Council of the Empire which will throw heavy expenses upon the proprietors of manufacturing establishments in Russia. If a workman is injured in the manufactory the proprietor will have to pay all costs during the whole time he is unable to work and the whole of his ordinary wages; if the workman is killed on the spot, or if his death afterwards is the consequence of the injuries received, the proprietor must pay the funeral costs and annuities to his widow and his children. The widow receives an annuity during her life of 30 per cent. of her deceased husband's wages, and the children an annuity of 15 per cent. each of their father's wages until they reach their fifteenth year; if they have no mother the annuities are increased to 20 per cent. If a working child is killed or mutilated the parents receive annuities of 15 per cent. each. There is no doubt this Bill will be voted by the Council of the Empire, and will receive Imperial sanction.

SMOKELESS POWDER.—In some comparative experiments with the smokeless powder C/89 fired from cannon of various calibres, which took place on the shooting ground connected with the Grusonwerk, Buckau, near Magdeburg, it was proved that the new powder yielded an effect from three to four times greater per kilo. of the charge than the old sorts of powder. The powder C/89 threw off a thin brownish vapour which was so thin that another shot could immediately be fired, the butt being distinctly visible. Even in rainy weather the vapour was completely dissipated within three seconds, whilst the smoke resulting from black powder hung about the gun for a long time, making a quick firing impossible. The powder C/89 leaves so little residuum after combustion that the bore remains almost clean, and the heating of the barrel and cartridge holder is much less than with black powder.—*Kuhlou.*

KEROSENE IN STEAM BOILERS.—At the Cincinnati meeting of the American Institute of Mechanical Engineers, "Notes on Kerosene in Steam Boilers" was the title of a paper presented by Professor Carpenter. The boilers experimented on were of the ordinary tubular type, 12ft. in height, four being 4ft. in diameter, and the other two 5ft. in diameter. When the use of oil was begun the boilers were badly incrustated with a hard scale. The first application of oil was made by inserting about a gallon, then filling the boiler with water, heating to the boiling point and allowing the water to stand two or three weeks before removing. This succeeded in removing fully one-half the scale. This was found to be a more effective way than that of applying the oil in small quantities when the boiler was in use. Kerosene oil was used in this case. It was found that there was no advantage to be derived from the use of more than a certain quantity of oil. For boilers 4ft. in diameter and 12ft. long, the best results were obtained with two quarts of oil for each boiler per week. The boilers now have less scale in them than at any previous time within four years, and the small quantity remaining in them seems to be soft and gradually disappearing. In the discussion which followed, C. W. Nason said that in one case, with the use of crude petroleum in a boiler badly scaled, it was noticed that the scales came off in cakes, the oil seeming to enter between the scale and iron, and thereby separating the two. These cakes varied considerably in size, and in some cases were quite large.

THE BANKRUPTCY BILL.—The House of Commons Standing Committee on Trade gave further consideration on Thursday to the Bankruptcy Bill introduced by Sir A. Rollit, Mr. A. O'Connor presiding. On the motion of Sir A. Rollit, the Committee added the following sub-section to Clause 9, which lays down the conditions on which a bankrupt shall obtain his discharge:—"That the bankrupt has, within three months preceding the date of the receiving order, incurred liabilities in order to make his assets equal to 10s. in the pound on the amount of his unsecured liabilities." Mr. Dixon-Hartland proposed to omit from the clause the provision that on proof of any of the offences mentioned in the section, or in section 28 of the principal Act, the Court should have power to suspend the bankrupt's discharge for not less than five years. Mr. Chamberlain pointed out that if the amendment were carried it would be necessary to strike out some portion of the old Act. He hoped the amendment would be withdrawn and the *minimum* period reduced. The amendment was negatived without a division, and it was then resolved, by 23 to 10, on the motion of Mr. Gedge, to substitute two years for five years. Sir A. Rollit moved the following addition to the clause:—"Provided that, if at any time after the expiration of two years from the date of any order made under this section the bankrupt shall satisfy the Court that there is no reasonable probability of his being in a position to comply with the terms of such order, the Court may modify the terms of the order, or of any substituted order, in such manner and upon such conditions as it may think fit." The words were added to the Bill. The 4th and 5th sub-sections were struck out. The Committee adjourned.

REPORTED CLOSING OF HEIDELBERG UNIVERSITY.—A considerable sensation has been created at Heidelberg by an alarming report that the Government contemplates closing the University of that city. It is difficult to conceive the object of so retrograde a step—what moreover, would be exceedingly unpopular in Germany.—*Truth.*

SUNDAY WORK WITHOUT PAY.—At Wakefield County before Judge Greenhow, Locke and Co., of St. John's Colliery, manton, were sued for £3. 12s., in lieu of notice, by an ex-d named Edwin Bennett. Plaintiff's case was that early in Janus was engaged as deputy by the certified manager, Mr. Wilson, not having been said at the time about Sunday work. Finding the predecessor used to do Sunday duty, the plaintiff voluntarily consented to follow the example; but on the 19th April he was to the underground steward that there would be no work for him day, as work was only available for a limited number. Plaintiff then reminded that next day (Sunday) it would be his turn for whereupon the plaintiff rejoined that if he could not work for p Saturday he was not going to work for nothing on Sunday. On ensuing Monday morning, when he presented himself at the colliery he was sent about his business, and hence the action. His Honor gave a verdict for the plaintiff, with costs.

STANDARD TESTS AND METHODS OF TESTING OF MATERIALS.—A committee of the American South-Western Mining Association (says the *Engineering and Mining Journal*) was appointed about years ago, and consisted of Messrs. Henry R. Towne, Gu Henning, R. H. Thurston, Chas. H. Morgan and Thomas Eglar. A preliminary report with a copious appendix is presented by Henning, the reporter of the committee, which shows that it has doing a great deal of work in the direction of establishing a uniform system of testing and reporting on materials of construction. The practice of England, France, Belgium, and Germany has been studied and it is found that in Germany far more attention has been paid to scientific testing than in any other country. Duplicate tensile pieces of steel and iron were sent to twenty-four places having testing machines, including iron, steel, and bridge works, technical colleges, and testing laboratories. Sixteen of these have reported the results, which are published in the report, and the uniformity of results is stated by the committee to be satisfactory, showing that harmony exists among experts in the United States in the methods pursued in testing and in making out reports. The committee make a number of recommendations in regard to standard methods of testing. One of the most important is a new method of measuring the elongation of the test piece, the old method having results not properly comparable, on account of the fracture taking place sometimes near the middle of the piece and sometimes at the ends. By the new method, the specimen is divided by gauge marks before test, into inches and half inches. After fracture, measurements are made as follows:—Having divided the standard length into 24 parts, measure from the point of fracture to cover all divisions to 12 to the right—or 12 parts—then measure from the fracture towards the left to four, and add the elongation of parts 4 measured to right of fracture, or eight parts, to this; thus elongation of the standard 24 parts will be obtained as though fracture were located exactly at the middle division, for the elongation of the divisions 4—12 on the right is, undoubtedly, practically the same as that of a similar original length would be if located on the other side of the fracture.

Market Reports.

THE LIVERPOOL MINERAL MARKET.

During the past week our market has maintained its firmness of prices, whilst a fair amount of business has been done. Arrivals have been somewhat small this week, and both for spot and forward delivery are firm. Magnesite offering, and prices in buyers' favour. Raw lump 26s., ground £6. 10s., and calcined ground £10. to £11. Ba (Irish Hill brand): The production is scarcely able to pace with the demand, and prices are very firm—Lump, seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. ton at the mine. French Chalk: There have been more arrivals this week, but the best part have gone direct into consumption prices are unchanged, especially for G. G. B. "Angel White" brand, 9 100s. medium, 105s. to 110s. superfine. Barytes (carbonate) more in selected crystal lump is scarce at £6.; No. 1 lumps, 90s.; best, seconds and good nuts, 70s.; smalls, 50s.; best ground £6.; and selected crystal ground, £8. Sulphate firm, and prices are better; best 1 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; com

6d. to 20s.; ground best white, G.G.B. brand, 65s.; common, grey, 32s. 6d. to 40s. Pumicestone unaltered; ground at £10., specially selected lump, finest quality, £13. Iron ore easier. io and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; berland, 10s. to 12s. 6d. Purple ore quiet. Spanish manganiferous continues in fair demand. Emery-stone: Finest lump sought and brings full prices. No. 1 lump is quoted at £5. 10s. to and smalls £5. to £5. 10s. Fullers' earth steady; to 50s. for best blue and yellow; fine impalpable and, £7. Scheelite, wolfram, tungstate of soda, and tungsten continue in fair demand. Chrome metal, 5s. 6d. per lb. me ore: Best and lower grades offered freely, and prices easier. Antimony oxide, 24s. to 26s. Asbestos in strong demand, cially rock; prices firmer. Potter's lead ore continues firm; ls, £14. to £15.; selected lump, £16. to £17. Calamine: Best ities scarce—60s. to 80s. Strontia steady; sulphate (celesteady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; dered (manufactured), £11. to £12. Limespar: English ufactured, old G.G.B. brand in demand, and brings full prices; for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish; best Ceylon lump at last quotations; Italian and Bohemian, £4. 12. per ton; founders', £5. to £6.; Blackwell's "Mineraline," French sand, in cargoes, continues scarce on spot—20s. 2s. 6d. Ferro-manganese and silicon spiegel easier. Chrome iron, tered at last quotations. Ground mica, £50. China clay freely ing—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. 5s. (at Runcorn).

THE TYNE CHEMICAL REPORT.

TUESDAY.

There is very little change to report in chemicals this week. Prices round, with the exception of bleaching powder, have kept fairly dy, and are much about the same as last week. Bleaching powder ery weak and has dropped half-a-crown a ton, with little doing at moment. Caustic soda is in better demand and market stronger. la ash, crystals, and sulphate of soda practically unchanged. Prices ent are as follows:—Bleaching powder, in softwood casks, £4. 15s. ton, nominal quotation; caustic soda, 77%, £9. per ton; ground packed in 3-4 cwt. barrels, £12. per ton; soda ash, 48/52%, d. per degree, less 5%; soda crystals, in casks, £2. 11s. per ton, s weight; in 2 cwt. bags, £2. 11s. per ton, net weight; in 1 cwt. s, £2. 13s. 6d. per ton, net weight; sulphate of soda, in bulk, 32s. ton; ground and packed in casks, 42s. per ton; recovered ur, £4. 5s. per ton; chlorate of potash, 4½d. per lb.; silicate of 1, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; Tw., £4. per ton; hyposulphite of soda, in 1 cwt. kegs, 15s. per ton, in 5-7 cwt. casks, £5. 5s. per ton; pure white ate of alumina, £4. 10s. per ton; blanc fixe, £7. 10s. per ton; ride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. ton—all f.o.b. Tyne, or f.o.r. makers' works.

The price of small coals, for manufacturing purposes, is again lower week. The stoppage of the Tyne Plate Glass Works throws t 800 tons of small weekly into the market. Northumberland a is quoted from 7s. to 7s. 6d. per ton, and Durham small from d. to 8s. 6d. per ton. The Northumberland miners have sent in plication for an advance of wages, and it is expected the colliery rs will meet together about the end of the month to consider the cation.

THE COPPER MARKET.

Mr Messrs. Harrington and Co.'s report of June 17th we note Chili Copper Charters for first half of June are advised as 800 fine. Price of bars about 25.40 dols., and exchange 23¾d. charters since January 1st have been 11,300 tons, against 5 tons for same time last year. An extensive business has been in G.m.b.'s and G.o.b.'s, and with but few oscillations market y advanced from £54. 5s. to £59. 15s. cash, and £54. 15s. to for three months prompt; closed steady at £59. 5s. and £59. 15s. on respectively. The estimated decrease in visible supply, nd and France, is 6,700 tons fine.

Present stock of English G.m.b.'s in warehouse, Liverpool and ea, is 5,286 tons, against 5,383 tons on 31st ult., showing a e of 97 tons in the fortnight. The feature of the fortnight has a winding-up of sales of the entire stock of Anaconda Matte in April was 23,461 tons) on behalf of French holders— ing with sales at 9s. 9d., they finally sold at 11s. 6d.

MISCELLANEOUS CHEMICAL MARKET.

There has been some slight improvement in the position of soda during the week, and prices are rather higher. Quot the spot are:—For 77% on the Tyne, £9. 15s., and f.o.b. 74%, £9 per ton; 70%, £8. 10s.; 60%, £7. 10s. Soda is more easily obtainable, and for prompt and early delivery range from 1½d. to 1¾d. per degree at makers' works, steady at £2. 18s. 9d. to £3 2s. 6d. at works. Chlorate of potash dull at 4½d. per lb. Bleaching powder, to £5. per ton on rails, according to brand, makers being with orders. Saltcake 27s. in bulk. Vitriol and muriatic ac changed in values. Recovered sulphur well sold, and a firm Demand for sulphate of copper has to some extent fallen off, prices are a turn lower for near deliveries—on the spot £24. £24. 10s., and July £22. 10s. Lead salts quiet, and prices changed. Acetate of lime, brown, £7. 7s. 6d. to £7. 10s. per ton at usual points, and in plentiful supply. Acetic acids and acetate of soda without material change. In tartaric and citric acids there are small sales at 1s. 2½d. and 1s. 3d. per lb. Oxalic acid quiet again at 3¾d. to 3½d. per lb. Picric acid 1s. 1d. to 1s. 2d. per lb. For carbolic acid crystals the demand is still small, and prices consequently are at a low point. Prices during the week have been a shade easier, but any appearance of larger orders in the market will directly influence the value of this article, which at present is far from satisfactory to the producers. Potash, caustic and carbonate, are selling freely, and prices remain firm. Sulphocyanides are in small demand, and supplies have been curtailed. Aniline oil and salt are steadily maintained in price.

REPORT ON MANURE MATERIAL.

There has been a very fair amount of business doing during the past week, and prices all round are maintained, but there has scarcely been so much activity as there was at the beginning of the month.

We have nothing fresh to report in the position of mineral phosphates, nearest values for cargoes of Bull River rock being 10½d. per unit cost, freight, and insurance to United Kingdom, and of land rock 9½d. per unit. 70/75% Somme is still quoted 15½d., and 60 65% 12d., one-fifth rise in each case. The quotations for Canadian and Belgian remain as quoted a week ago.

We do not hear of any business in cargoes of River Plate bones for the United Kingdom, but several sales have been made for the United States at the equivalent of £5. 7s. 6d. to United Kingdom. The advanced rate of exchange with India is stopping business in crushed bones and bone meal, and we do not hear of any sales having been made for shipment ahead. On spot fine Bombay meal is selling at £5. 10s. ex-store, and inferior quality at £5. 5s. There is no stock of crushed bones here, and nothing under £5. 5s. would be cable for shipment. Parcels of common grinding bones still meet with a ready demand at £4. 15s. to £4. 17s. 6d. Nearest value of River Plate bone ash is £5. 7s. 6d. on 70%. Some further cargoes of nitrate of soda have been sold at 8s. per cwt. for ordinary quality, March shipment up to 8s. 4½d. for refined. Due cargoes are worth fully 8s. ordinary quality, and at present sellers will not accept that price. June-July shipments are worth 8s. 4½d., and September-October about 8s. 9d., delivered good United Kingdom ports.

The position of dried blood and ammonite remains unchanged, but there is decidedly more inquiry for both.

Kainit is scarce at 40s. per ton.

Supers are somewhat irregular, owing to parcels in second hands being offered for re-sale, and the nearest value of 26% is probably 45s. per ton, in bulk, f.o.r. at works.

TAR AND AMMONIA PRODUCTS.

Prices for benzol may be taken as the same as last week, 3s. 9d. for 90s. and 2s. 9d. for 50/90s. The feature of the anthracene market is a confederation which has just been formed by some half-dozen of the largest tar distillers, with a view to maintaining the price of A at 1s. 6d., and B at 1s. 3d. The success of the movement is very problematical.

Sulphate of ammonia prices show a still further decline. After touching £11. there has, at the last moment, been a slight recovery to £11. 1s. 3d., London and country, while the Beckton price remains nominally £11. 5s.

LOCAL MARKET THE LIVERPOOL COLOUR MARKET.

Colours unaltered. Ochres: Oxfordshire quoted at £10., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 70s. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. 10s. to £19. 10s. Zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 10s. 6d.; blue, 6s. 6d. Zaffres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto, 25s. Jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, fine quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

Although the position of caustic soda has improved in quite a measurable degree, the general market is still very flat, and prices are even easier in some of the lines. Nitrate of soda is firmer and dearer at the moment, but as yet its home competitor sulphate of ammonia shows no signs of taking the turn, rather the reverse, for last week's value has not been maintained, and Leith delivery has been done at £11. 1s. 3d. spot, not to say quite freely, for a few holders decline to part at that, but still in some volume. Indeed, one parcel went at £11., but this particular lot not having been up to the average mark in respect of quality, the transaction was not strictly within the regular market category, and the true representative value, therefore, has not yet quite descended to that low point. Enquiry about forward sulphate has been pretty active, without result, makers' notions being incompatible with the prevailing buying idea. Scotch bleach makers have come down very low to make business, and £4. 12s. 6d. to £4. 15s. has been done. Bichromates still in feeble demand. Paraffins unchanged, and pretty firm—all except burning oil, now entering the contract season against coming winter. Hardly anything has been booked yet for Scotch delivery, but some English orders (at lower prices) have been secured. Chief prices current are:—Soda crystals, 52s. net Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined, £29. 10s., and boracic acid, £37. 10s. net Glasgow; soda ash, 1¼d. less 5% Tyne; caustic soda, white, 76° £9. 10s., 70/72°, £8. 10s., 60/62° £7. 10s., and cream, 60/62° £7., all less 2½%. Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 15s., and 1 cwt. casks, £6. net Tyne; refined alkali, 48/52°, 1½d., less 1¼%. Tyne; saltcake, 27s. to 29s.; bleaching powder, £4 12s. 6d., to £4 15s., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda 3d., less 5% and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. 1½d. to 8s. 3d.; sulphate of ammonia, spot, £11. 1s. 3d. f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £23. 10s., less 5% Liverpool; paraffin scale, hard and soft, 2¾d. per lb.; paraffin wax, 120°, semi-refined, 3¼d.; paraffin spirit (naphtha), 7d. a gallon; paraffin oil (burning), 6¾d. to 7d. on rails Glasgow to all Scotch buyers (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 86s. 5d. to £6. per ton; 88s. 5d., £6. 10s.; and 890/895°, £7. 15s. to £8. Week's imports of sugar at Greenock were 57,111 bags.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis and Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Steam Reducing Valves. T. Charlton and W. Pepper. 8,491. June 2.
Treatment of Sewage. J. Macfarlane and O. P. Macfarlane. 8,498. June 2.
Air Pumps.—(Complete Specification). H. Schulze-Berge and F. Schulze-Berge. 8,499. June 2.
Paper Finishing Apparatus. F. Butterfield and W. Renton. 8,504. June 2.
Yellow Colouring Matter. O. Imray. 8,506. June 2.
Heat Generating Apparatus. E. Broadhead, W. Beesley, and D. Evans. 8,510. June 2.
Boiler Gauge Glass Fittings. J. Burlinson. 8,511. June 2.
Manufacture of Cement. O. Prinz. 8,519. June 2.
Decorating Textile Plants. P. A. Favier. 8,520. June 2.
Manufacture of Aerated Liquids. C. Lock. 8,524. June 2.
Azo Colours upon Fibres. B. Willcox. 8,530. June 2.
Edge Runner Grinding Mills. P. J. Neate. 8,531. June 2.
Scrapers for Edge Runner Grinding Mills. P. J. Neate. 8,532. June 2.
Secondary Batteries. N. de Binardos and Lloyd and Lloyd. 8,534. June 2.

Manufacture of Illuminating Gas. S. Pitt. 8,535. June 2.
Development of Colouring Matters in Textile Fabrics.—(Complete Specification). J. J. Hart. 8,541. June 3.
Filter Presses.—(Complete Specification). W. H. Johnson and C. C. Hut. 8,544. June 3.
Apparatus for Charging Retorts. C. Eitle. 8,554. June 3.
Brick-making Machinery.—(Complete Specification). B. C. White. 8,563. June 3.
Galvanizing. T. L. Thomas and J. B. Hillman. 8,572. June 3.
Secondary Batteries.—(Complete Specification). J. V. Johnson. 8,573. June 3.
Paper Winding Apparatus.—(Complete Specification). J. Y. Johnson. June 3.
Manufacture of Building Blocks from Slag. S. G. T. C. Bryan. June 3.
Amalgamating Machinery. W. W. Fyfe. 8,609. June 3.
Filtering Apparatus. W. L. Wise. 8,614. June 4.
Stone-Breaking Machinery. S. B. Goodwin, W. Barsby, and R. 8,622. June 4.
Grinding and Crushing Mills. W. Barford and J. E. S. Perkins. June 5.
Manufacture of India-rubber Rolled Fabrics. R. K. Bailey, of the Chas. Macintosh & Co. Ltd., and J. Dempsey. 8,683. June 5.
Treatment of Sewage. J. Chaffer and L. Simms, both of the British and Refuse Co. 8,685. June 5.
Furnace Grates. J. Keith. 8,688. June 5.
Pulverizers and Amalgamators. T. E. Bickle. 8,696. June 5.
Gas Furnaces. J. von Langer and L. Cooper. 8,707. June 5.
Electrolytic Treatment of Sulphite of Zinc. E. Edwards. 8,716. June 5.
Substitutes for Fulminate of Mercury. E. Blinkhorn. 8,717. June 5.
New Derivatives of Alizarine and its Analogues. B. Willcox. June 5.
Manufacture of Naphthalene. F. Fenner and F. W. Colls. 8,728. June 6.
Manufacture of Carbonic Acid Gas. W. Bruce. 8,733. June 6.
Separating Oxygen and Nitrogen from Atmospheric Air. W. 8,752. June 6.
Manufacture of Iron and Steel. J. von Langer. 8,759. June 6.
Electric Motors.—(Complete Specification). H. Glosmith. 8,778. June 6.
Liquid Meters. J. A. Müller. 8,784. June 6.
Manufacture of Fuming Sulphuric Acid. G. Léon. 8,786. June 6.
Electric Motors and Dynamos. A. Schanschiff. 8,787. June 6.
Feed Water Purifying Apparatus.—(Complete Specification). J. Y. J. 8,788. June 6.
Apparatus for Evaporating, Concentrating, and Distilling. W. R. and R. A. Robertson. 8,790. June 7.
Dyeing. A. North. 8,799. June 7.
Secondary Batteries. W. P. Thompson. 8,800. June 7.
Dyeing. W. L. Wise. 8,809. June 7.
Manufacture of Gunpowder. H. Kolf. 8,811. June 7.
Obtaining Alloys of Aluminium. J. Clark and G. W. Clark. 8,820. June 7.
Gold Extraction. J. Coombs. 8,826. June 7.
Measuring Liquids.—(Complete Specification). W. A. Sheppard. June 7.
Rendering Nitrate of Ammonium Non-Hygroscopic. E. Blinkhorn. June 7.
Nitrifying Cotton and Similar Material.—(Complete Specification). Müller. 8,843. June 7.
Manufacture of Whisky and other Spirits. E. J. Taylor. 8,850. June 7.
Electric Meters. L. A. W. Desruelles and R. F. O. Chauvin. 8,854. June 7.

New Companies.

BROWN PAPER FIBRE COMPANY, LIMITED.—This company was registered the 6th inst., with a capital of £2,000, in £1. shares, to manufacture fire wood, earth, or other substances, a flock or material for manufacturing paper for upholstery and other purposes. An unregistered agreement between London and Wm. Snowden Hedley will be adopted. The subscribers are:—

W. S. Hedley, M.D., Midford, near Bath
Mrs. Hedley, Midford, near Bath
A. S. King, 12, Queen-square, Bath, solicitor
C. E. Thomas, 13, Queen-square, Bath
J. A. London, 116, Sandford-road, Newcastle, paper manufacturer ...
J. A. London, junr., 116, Sandford-road, Newcastle, clerk
A. Robinson, 27, Perry-park-road, solicitor

JAMES BRIERLEY AND COMPANY, LIMITED.—This company was registered the 10th inst., with a capital of £30,000, in £5. shares, to adopt an unregistered agreement of 24th ult., with James Brierley, and to carry on at Heywood, where, the business of brewers. The subscribers are:—

J. Tetlow, Heywood, beerseller
R. Arnfield, Heywood, mill manager
J. R. Greenhalgh, Heywood, joiner and builder
J. Holt, Heywood
C. Brierley, Rochdale, beerseller
T. Jaques, Middleton, beerseller
W. H. Heaton, Bury, licensed victualler

Gazette Notices.

Partnerships Dissolved.

RADAMS BROS., Birmingham, paint and colour manufacturers.
HALLS AND PHILLIPS, Atherstone and Nuneaton, hat manufacturers.

THE BANKRUPTCY ACT, 1883.

Receiving Orders.

JAMES LEARMOUNT, South Shields, oil dealer and drysalter.

Adjudications.

ROBERT SNELL WILLIAMS AND WILLIAM MILLNER (trading as the Boot Stores Company), Bootle, paint and oil dealers.

IMPORTS OF CHEMICAL PRODUCTS

AT

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LONDON.

ending June 7th.

114 c.	Arnati & Harrison
100	Charles & Fox
£60.	Gilliard & Holt
1 Ore—	
40 t.	Bk. of N. S. Wales
10	H. Emanuel
10	
and, 12 t.	R. T. Turnbull & Co.
1, 16	H. Emanuel
Acid—	
90 pks.	A. & M. Zimmermann
21	Phillipps & Graves
150	Beresford & Co.
of Lime—	
25 t.	Johnson & Hooper
ales, 1 t.	Dalgely & Co., Ltd.
es, 4	L. & I. D. Jt. Co.
land, 1	R. Brooks
one—	
11 t.	R. Morrison & Co.
20	B. Jacob & Son
400	W. C. Bacon & Co.
400	Brandram, Bros., & Co.
200	Northcott, Sons, & Co.
is—	
m, 22 cks.	Leach & Co.
ny, 19	H. A. Litchfield & Co.
19	
22	W. Harrison & Co.
m, 140	A. Zumbek & Co.
Regulus—	
y, 45 t.	A. Gibbs & Sons
25	Vivian, Younger, & Co.
ras—	
ny, £55.	Burgoyne, Burbidge, & Co.
e Potash—	
8 drs.	J. A. Reid
26	F. W. Berk & Co.
to Soda—	
nd, 100 c.	Beresford & Co.
chouc—	
bar, 15 c.	Anderson, Weber, & Smith
tave, 40 W.	Johnston & Co., Ltd.
ce, 13	Thames S. T. Co.
agascar, 160 c.	L. & I. D. Jt. Co.
85	Kebbel Son & Co.
ce, 21	
tave, 48	
323	A. Frey & Co., Ltd.
10	Gallaty, Hankey, & Co.
66	Anderson, Weber, & Smith
Africa, 189	W. Johnston & Co., Limited
ce, 60	L. & I. D. Jt. Co.
bar, 21	Clarke & Smith
47	Lewis & Peat
ies, 121	C. Scheeps & Co.
20	Anderson, Weber, & Smith
bar, 230	L. & I. D. Jt. Co.
or Sulphate—	
um, 32 cks.	Middleton & Co.
nd, £338.	
t Ore—	
ey, 4 c.	Mason, Bros., Ltd.
n of Tartar—	
ce, 5 pks.	B. & F. Wf Co., Ltd.
icals (otherwise undescribed)	
ce, £96.	E. W. Carling & Co.
any, 58	T. H. Lee
50	Craven & Co.
384	A. & M. Zimmermann
1, 20	L. & I. D. Jt. Co.

Chemicals—continued

Holland, £10	H. Boyce
" 15	Phillipps & Graves
" 85	R. Morrison & Co.
Germany, 14	F. Stablschmidt & Co.
U. S., 120	C. Faust & Co.
U. S., 16	G. Boor & Co.
Germany, 19	J. James & Son
" 50	Phillipps & Graves
" 135	T. H. Lee
" 150	A. & M. Zimmermann
Holland, 14	R. Morrison & Co.
Germany, 60	T. H. Lee
900	A. & M. Zimmermann
Dyestuffs—	
Holland, 33 pks.	Little & Johnson
Anthracene	
A. Turkey, 56 t.	A. & W. Nesbitt
" 20	J. Graves
" 60	Anning & Cobb
Extracts	
U. S., 61 pks.	G. B. Mackereith
" 55	T. Ronaldson & Son
France, 250	L. J. Levinstein & Sons
Gambler	
E. Indies, 210	W. H. Cole & Co.
Singapore, 213	L. & I. D. Jt. Co.
Sts. Settlements, 294 brls.	R. & J. Henderson
China, " 967	W. H. Cole & Co.
" 648	L. & I. D. Jt. Co.
Cochineal	
Singapore, 219 pks.	
Canaries, 4	Johnson, Rolis, & Co.
" 12	Schenker & Co.
" 21	Bruce & White
Alizarine	
U. S., 5	British Alizarine Co.
Annatto	
France, 4	Hurford & Middleton
Tanners' Bark	
U. S., 27 t.	J. Graves
Adelaide, 79	Devitt & Hett
" 17	Goad, Rigg, & Co.
Melbourne, 85	Baxter & Hoare
Sydney, 1	L. & I. D. Jt. Co.
Melbourne, 4	Anning & Cobb
Holland, 29	H. Henle
" 50	Hicks, Nash, & Co.
" 5	Baxter & Hoare
Melbourne, 400	
" 103	Beresford & Co.
Sydney, 10	Anning & Cobb
Launceston, 203	A. & W. Nesbitt
" 52	Culverwell, Brooks, & Co.
" 10	Hicks, Nash, & Co.
Holland, 24	G. S. N. Co.
" 50	Boutcher, Mortimore, & Co.
" 27	J. J. Williamson & Son
Melbourne, 102	A. & W. Nesbitt
Sydney, 45	W. H. Boulton
Indigo	
Holland, 2 chts.	L. & I. D. Jt. Co.
Sweden, 1	"
E. Indies, 22	"
" 18	Parsons & Keith
" 10	W. Isted
E. Indies, 15 chts.	Arbuthnot, Latham, & Co.
" 10	L. & I. D. Jt. Co.
" 83	"
" 203	Barlow & Bros.
" 57	L. & I. D. Jt. Co.
E. Indies, 86	"
" 22	J. Forsey
Germany, 1 box	L. & I. D. Jt. Co.
Myrabolams	
E. Indies, 4,098 pks.	W. Shelcott
" 173	L. & I. D. Jt. Co.
" 173	"
" 1,107	"
" 1,340	Beresford & Co.
" 1,033	J. P. Alpe & Co.
Turmeric	
E. Indies, 294	Newcomb & Son
Safflower	
E. Indies, 25 bls.	L. & I. D. Jt. Co.
Argols	
Italy, 808 pks.	B. Jacob & Son

Sumac

Italy, 1,215 pks.	J. Kitchen. Ltd.
" 400	W. France & Co.
" 400	W. Shelcott
Cutch	
E. Indies, 900	Wrightson & Son
" 200	Middleton's S. S. Wf. Co.
Gutta Percha—	
Singapore, 423 c.	Kaltenbach & Schmitz
Glycerine—	
Germany, £120	Beresford & Co.
" 32	T. H. Lee
Glucose—	
U. States, 40 pks.	211 cwts. Page, Son, & East
" 25	148 Union Lighterage Co. Ltd.
Germany, 120	668 L. Sutro & Co.
" 57	405
" 70	680 L. & I. D. Jt. Co.
" 75	595 Pillow, Jones & Co.
" 1,000	1,000 R. E. Drummond & Co.
" 25	200 T. M. Duche & Sons
" 1,000	1,000 T. C. Howell
" 310	300 J. Barber & Co.
" 100	100 Fellows, Morton & Co.
France, 100	212 J. Knill & Co.
" 100	100 Barrett, Tagant & Co.
U. States, 800	800
" 72	360 T. H. Lee
" 100	560 Union Lighterage Co. Ltd.
Germany, 15	135 J. Knill & Co.
U. States, 150	900 L. Sutro & Co.
" 38	190
Germany, 24	200 J. Knill & Co.
" 25	199 Pillow, Jones & Co.
" 30	236 Prprs. Chmbln's Whf.
U. States, 50	250 Allan Bros.
" 64	360 Union Lighterage Co. Ltd.
Germany, 100	100 J. Barber & Co.
" 50	395 Pillow, Jones & Co.
" 40	349 Prprs. Chmbln's Whf.
U. States, 150	710 Union Lighterage Co. Ltd.
Isinglass—	
Germany, 4 pks.	L. & I. D. Jt. Co.
E. Indies, 18	"
" 17 cs.	Clarke & Smith
France, 44 bgs.	L. & I. D. Jt. Co.
Demerara, 2 brls.	J. Hales, Caird & Co.
E. Indies, 1 pkg.	Forbes, Forbes & Co.
Demerara, 2	L. & I. D. Jt. Co.
U. States, 10 pks.	W. M. Smith & Sons
Germany, 17	L. & I. D. Jt. Co.
Manganese Ore—	
Japan, 10 t.	Matheson & Co.
Pt. Augusta, 54	F. Manders
" 38	Harrold Bros.
Manure—	
Holland, 133 t.	Miller & Johnson
Aruba, 290	J. A. Cockman
Holland, 205 t.	Lawes Manure Co. Ltd.
France, 136	Anglo Cntnl. Guano Works
" 115	A. Hunter & Co.
B. Ayres, 6	L. & I. D. Jt. Co.
Phosphate Rock	
Belgium, 138 t.	A. Hunter & Co.
Naptha—	
Belgium, 6 drs.	Lister & Biggs
Holland, 19	Little & Johnston
Belgium, 44	Domeier & Co.

Paraffin Wax—

U. States, 75 brls.	Prop. Chamberlain's Whf.
" 330	H. Hill & Sons
" 1,075	J. H. Usmar & Co.
Potash—	
Holland, 14 pks.	Spies Bros. & Co.
Potassium Bicarbonate—	
Holland, 9 cks.	A. & M. Zimmermann
Plumbago—	
China, 76 brls.	L. & I. D. Jt. Co.
Germany, 17 cks.	H. J. Huth & Co.
E. Indies, 80 brls.	Prop. Chamberlain's Wharf
" 225	E. Barber & Co.
Germany, 335 cs.	Prop. Scott's Wharf
E. Indies, 108 brls.	J. Thredder, Son & Co.
Sodium Hyposulphate—	
Germany, £90	J. James & Son, Germany
Holland, 130	Beresford & Co.
Sugar of Lead—	
Holland, £40	Beresford & Co.
Sodium Acetate—	
Holland, £95	Soundy & Son
Saltpetre—	
Germany, 8 cks.	Craven & Co.
" 100	T. Merry & Son
Holland, 64	C. Wimbale & Co.
E. Indies, 1,330 bgs.	Ralli Bros.
" 1,178	C. Wimbale & Co.
Germany, 118 cks.	P. Hecker & Co.
Soda Ashes—	
Holland, 200 c.	Taylor, Sommerville & Co.
Stearine—	
France, 10 sks.	Van Geelkerken & Co.
Belgium, 125 bgs.	H. Hill & Sons
Holland, 54	"
France, 293	"
" 54 sks.	Beresford & Co.
Tar—	
France, 3 brls.	Burt, Boulton & Co.
Tartaric Acid—	
France, 24 pks.	B. & F. Wf. Co. Ltd.
" 40	W. C. Bacon & Co.
Holland, 4	Northcott & Sons
Tartar—	
Italy, £2,265	Thames S. Tag Co.
" 550	Seager, White & Co.
Turpentine—	
U. States, 2,652 brls.	Nickoll & Knight
Brunswick, 1,500 brls.	Nickoll & Knight
Ultramarine—	
Holland, 4 cks.	Ohlenschlager Bros.
Germany, 4	G. Steinhoff
" 16 cs.	Hughes, Barrett & Co.
Zinc Oxide—	
France, 19 cks.	W. Harrison & Co.
Holland, 20	G. Dards
" 161 brls.	M. Ashby

LIVERPOOL.

Week ending June 10th.

Albumen—

Hamburg, 1 ck.

Bones—

Talcabuan, 750 bgs. T. Berg

Parnahiba, 2 t. R. Singlehurst & Co.

Smyrna, 161 bgs. O. Gantes & Co.

Caustic Potash—

Dunkirk, 33 dms.

Cream of Tartar—
Tarragona, 5 cks.
Patras, 8 brls. Papayanni & Jeremias

Copper Ore—
St. John's, Nfld., 1 brl. J. J. Langley
New Orleans, 343 sks R. Bulman & Co
" 138 Cunningham & Shaw

Caoutchouc—
Para, 237 cs. 75 srs. F. Snarez & Co.
" 35 73 R. Singlehurst & Co.
" 39 104
Ceara, 5 bls. Leech, Harrison & Co.
Parnahiba, 2 cs. R. Singlehurst & Co.
Accra, 14 cks. Pickering & Berthoud
" 13 Taylor, Laughland & Co.
" 14 J. J. Fischer & Co.
" 3 Hutton & Co.
" 10 Edwards Bros.
" 5 C. Lane & Co.
" 28 Davies, Robbins & Co.
" 5 J. H. Rayner & Co.
" 8 F. & A. Swanzy
" 4 cs. 65 J. P. Werner
" 1 bg. Radcliffe & Durant
Sierra Leone, 154 brls. Pickering & Berthoud

" 104 cks.
Chemicals (otherwise undescribed)
Rotterdam, 7 cks.
Bremerhaven, 3 cs.

Dried Blood—
B. Ayres, 230 bgs.

Dyestuffs—
Argols
Brindisi, 285 sks.
Extracts
New York, 8 brls.
Divi Divi
Amsterdam, 844 bgs. Browne, Geveke & Co.
Hamburg, 208
Havre, 168 bgs.

Yalonia
Smyrna, 1 bg. G. Galatti

Dyestuffs (otherwise undescribed)
New York, 25 cs.

Glucose—
Stettin, 300 bgs. 12 cks.
Dunkirk, 100
New York, 130 brls.
Hamburg, 40 bgs. 15
Philadelphia, 40 brls.

Horn Pitthas—
B. Ayres, 33,245 kilos. Williamson, Milligan & Co.

Rosario, 34,654
Paysandu, 36,000
B. Ayres, 39,540

Isinglass—
Para, 24 cs. Bieber & Co.
" 12 Frith, Sands & Co.

Manure—
Phosphate Rock
Oruba, 320 t. Phospho Guano Co.
Charleston, 825
Montreal, 200
Corsaw, 1,660

Manganese Ore—
Poti, 1,880 t. Macqueen Bros.
Gothenburg, 100
Coquimbo, 850

Nitrate—
Iquique, 2,859 bgs.

Potash—
Dunkirk, 11 cks.

Pyrites—
Huelva, 1,624 t. Matheson & Co.

Phosphoric Acid—
Bremerhaven, 15 cs.

Potash Salts—
Hamburg, 100 brls.

Potassium Bicarbonate—
Rotterdam, 4 cks.

Saltpetre—
Hamburg, 6 cks.
Sodium Silicate—
Rotterdam, 1 ck.

Sulphur Ore—
Huelva, 1,130 t. Matheson & Co.

Tartaric Acid—
Rotterdam, 2 cks.

Turpentine—
Brunswick, 50 brls.

Ultramarine—
Rotterdam, 5 cks. 40 brls.
Hamburg, 30 cs.

Waste Salt—
Hamburg, 130 t.

Zinc Ashes—
Trieste, 5 brls. Hughes, Chenery & Co.

GLASGOW.

Week ending June 12th.

Barytes—
Rotterdam, 48 cks.

Caoutchouc—
New York, 312 bgs. 18 cs. 14 brls.

Chemicals (otherwise undescribed)
Rotterdam, 1 cs. J. Rankine & Son
Hamburg, 5 4 cks.

Dyestuffs—
Logwood
Jamaica, 704 t.

Alizarine
Rotterdam, 32 cks.

Extracts
Bordeaux, 375 cks.
Rouen, 4

Annatto
Bordeaux, 4

Gutta Percha—
Rouen, 2 cs.

Gypsum—
Rouen, 1 lot

Oxalic Acid—
Rotterdam, 5 cks.

Paraffin Wax—
New York, 175 brls. H. Hill & Son

Pitch—
St. Nazaire, 95 cks.

Phosphate—
Montreal, 100 t.

Sulphur Ore—
Huelva, 1,702 t. Matheson & Co.
Bergen, 180 t.

Tartaric Acid—
Rotterdam, 1 ck. J. Rankine & Son
St. Nazaire, 2 brls. F. & L. Sitzler

Tartar—
Bordeaux, 13 cks.

Ultramarine—
Rotterdam, 2 cks. J. Rankine & Son

Waste Salt—
Hamburg, 130 t.

" 260 1,320 bgs.

Zinc Oxide—
Antwerp, 5 brls.

HULL.

Week ending June 12th.

Albumen—
St. Petersburg, 60 cs.

Acids (otherwise undescribed)
Rotterdam, 5 cks. Wilson, Sons & Co.

Barytes—
Antwerp, 49 cks. Bailey and Leetham
" 61 H. F. Pudsey
Bremen, 10 cks. Veltmann & Co.
" 46 T. W. Flint & Co.

Caoutchouc—
Marseilles, 49 pks. Wilson, Sons & Co.

Chemicals (otherwise undescribed)
Genoa, 10 cks. Wilson Sons & Co.

Stettin, 31
Dunkirk, 250
Antwerp, 70 pks.
Hamburg, 796
Dantzic, 1 pkg.

Dyestuffs—
Argols
Bordeaux, 97 bgs. Rawson & Robinson

Extracts
Dunkirk, 47 cks. Wilson, Sons & Co.
Rouen, 30 Rawson & Robinson

Rennet
Copenhagen, 1 cs. Wilson Sons & Co.
Rotterdam, 5 cks. G. Lawson & Sons

Alizarine
Rotterdam, 5 cks. Hutchinson & Son
" 10 Hutchinson & Son
" 1 cs. 68 cks. W. & C. L. Ringrose

Madders
Rotterdam, 1 ck. J. Pyefinch & Co.

Glycerine—
Amsterdam, 5 crbys.

Glucose—
Dunkirk, 120 bgs.
Stettin, 200 18 cks. Wilson Sons & Co.

" 1,200 C. M. Lofthouse & Co.
" 200 25 cks.

Isinglass—
Hamburg, 1 cs. Wilson, Sons & Co.

Oxide—
Rotterdam, 1 cs. Hutchinson & Son

Pitch—
Hamburg, 61 brls.
Dantzic, 13 cks.
Amsterdam, 13 cks. H. F. Pudsey

Plumbago—
Hamburg, 1 brl. Furley & Co.
" 23 F. B. Grotrian
" 1 cs. 15 cks.

Stearine—
Rotterdam, 53 bls. G. Lawson & Sons
" 35 bgs. Wilson, Sons & Co.

Soda—
Rotterdam, 8 cks. G. Lawson & Sons

Sulphur—
Marseilles, 15 cks.

Tartar—
Bordeaux, 7 cks. Rawson & Robinson

Turpentine—
Libau, 51 brls.
Savannah, 1,500 cks.

Ultramarine—
Rotterdam, 1 ck.

TYNE.

Week ending June 10th.

Alum—
Rotterdam, 31 cks. Tyne S. S. Co.

Alum Earth—
Hamburg, 29 cks. Tyne S. S. Co.

Barytes Sulphate—
Antwerp, 52 cks. Tyne S. S. Co.

Barytes—
Antwerp, 64 cks. Tyne S. S. Co.
Rotterdam, 86

Copper Precipitate—
Huelva, 2,481 bgs. Bede Metal Chemical Co.

" 3,937 bgs. 2 cks. Henry Schofield & Son

" 14,754 bgs. A. Guthrie

" 2,819 Scott Bros.

Copper Ore—
Huelva, 375 t. Bede Metal Co.

Glucose—
Hamburg, 16 cks. Tyne S.

Pyrites—
Huelva, 2,185 t. Scott
" 1,756
" 300 t. A. Scott
" 1,260

Phosphate—
Antwerp, 260 t. Langdale's Co.

Salt Cake—
Hamburg, 150 t.

Saltpetre—
Hamburg, 268 t. Clephans & W.

Sulphur Ore—
Pomaron, 1,000 t. Mason &
Drontheim, 620

Ultramarine—
Rotterdam, 20 cs. Tyne S.

Waste Salt—
Hamburg, 250 t. Jarrow Chemi

GOOLE.

Week ending June 4th.

Alkali—
Ghent, 2 cks.
Rotterdam, 35

Alum—
Monte Christi, 40 brls.

Caoutchouc—
Boulogne, 5 cks.

Chemicals (otherwise undescribed)
Rotterdam, 1 ck.

Dyestuffs—
Divi Divi
Rio Hacha, 260 t.

Alizarine
Rotterdam, 21 cks.

Logwood
Monte Christi, 432 t.
Rotterdam, 691 pieces
Jamaica, 478 t.
Monte Christi, 330

Outline
Boulogne, 6 cs.

Dyestuffs (otherwise undescribed)
Boulogne, 1 cs. 2 pks. 44 cl
" 2 2 51

Glucose—
Hamburg, 23 cks. 100 bgs.
" 12 100

Potash—
Hamburg, 4 cks.
Dunkirk, 22
Calais, 41 drums

Red Lead—
Hamburg, 6 cks.

Saltpetre—
Hamburg, 3 cks.

Waste Salt—
Hamburg, 152 t. 296 brls.
" 335

GRIMSBY.

Week ending June 7th.

Caoutchouc—
Hamburg, 5 cks.

Chemicals (otherwise undescribed)
Rotterdam, 1 ck.

Glucose—
Hamburg, 10 cks.

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending June 4th.

Ammonium Sulphate—
Brought, 139 t. £1,668
Emmerick, 101 1,212

Ammonium Sulphate—continued.

Barbadoes, 100 t. £1,228
Amsterdam, 50 15 c. 560
Bebice, 5 63
Rotterdam, 20 6 225

Ammonium Carbonate—

Bremen, 24 pks. £79
Montreal, 40 kgs. 65
New York, 13 t. 8 c. £415

Ammonium Muriate—

Auckland, 1 t. 15 c.
Arsenic—
Melbourne, 5 t.

Acid—		
Al, 50 pks.	£120	
ton, 4 t. 9 c.	£101	
Acid—		
s, 2 cks.	£18	
rne, 1 t. 3 c.	45	
Acid—		
rg, 2 cs.	£44	
phia, 1½ c.	39	
Potash—		
liver, 600 lbs.	£23	
Bisulphide—		
phia, 4 t. 12 cs.	£59	
sa, 60 drs.	29	
Sulphate—		
ax, 4 t.	£87	
own, 10 c.	12	
ts, 21 18	455	
ts, 2	60	
Acid—		
ama, 10 cs.	£60	
ux, 10 pks.	30	
Acid Solid—		
ork, 30 cs.	£105	
lles, 120 cks.	20	
rg, 4 t. 16 c.	400	
le of Lime—		
own, 1 t. 5 c.	£12	
n Chloride—		
17 t.	£48	
c Soda—		
2 t. 18 c	£30	
10	20	
zen, 10	100	
of Tartar—		
and, 1 t.	£99	
astle, 10 c.	51	
5	26	
Acid—		
cal, 5 c.	£40	
5 cks.	36	
ls, 10	74	
2½	20	
tersburg, 1 t.	140	
rdam, 2	14	
roducts—		
ph, 50 brls.	£17	
pore, 100 rls.	43	
tta, 100 rls.	30	
ndria, 100 brls.	30	
ia, 1,976 t.	3,221	
oping, 1,000 brls.	£594	
tta, 50	44	
300 rls.	171	
azole		
rdam, 50 rls.	342	
ama, 10 drs.	26	
rdam, 43	840	
20 cks.	337	
thracene		
rdam, 252 cks.	£1,999	
61	435	
ldorf, 60	336	
60 sks.	348	
rdam, 150 cks.	950	
od Naptha		
tta, 10 dms. 50 gla.	£14	
2	26	
22 pks.	£194	
2	26	
26	46	
ndon, 5	33	
Blood—		
itius, 18 t. 10 c	£120	
ectants—		
o, 2 c.	£25	
agton, 84 pks.	50	
urg, 20 cks.	100	
ry, 100 gls.	30	
urg, 28 cks.	140	
25	150	
annite—		
itius, 10 t.	£300	
100 cks.	150	
ulphite of Lime—		
York, 3 cs.	£32	
3	63	
Sulphate—		
urg, 11 t. 14 c.	£55	
tic Acid—		
4 t.	£72	
re—		
n, 15 t.	£100	
ncent, 10	101	
urg, 30 9 c.	118	
nica, 19 16	200	
does, 25	250	
urg, 3	30	
does, 6	61	
ica, 3	31	
urg, 210	2,625	

Manure—continued.		
Madeira, 19 t. 17 c.	182	
Gr. Canary, 120	1,080	
Hamburg, 100	1,250	
Oxalic Acid—		
Antwerp, 8 cks.	£60	
Potassium Chlorate—		
New York, 1 t. 10 c.	£63	
1	42	
Phosphorus—		
Cape Town, 9 c.	£84	
Hiogo, 1,600 lbs.	195	
Yokohama, 500	60	
M. Video, 4 cs.	33	
Dunedin, 600 lbs.	55	
Sodium Hyposulphite—		
New York, 5 cs.	£53	
32		
Sodium Bisulphide—		
Philadelphia, 7 c.	£28	
Sodium Acetate—		
New York, 5 t.	£79	
Sulphur Flowers—		
Cape Town, 450 kgs. 125 cks.	£352	
Madeira, 3 t. 14 c.	41	
Sulphurous Acid—		
Shanghai, 3 c.	£35	
Sheep Dip—		
Algoa Bay, 15 t.	£840	
Fremantle, 2 16 c.	140	
Natal, 1 9	70	
Algoa Bay, 30 cs.	84	
E. London, 1 t. 14 c.	75	
Natal, 5 cs.	55	
E. London, 85 pks.	260	
Algoa Bay, 10 cs.	27	
Superphosphate—		
Mauritius, 78 t. 19 c.	£350	
Lyttleton, 99 7	395	
Sulphuric Acid—		
Singapore, 3 t. 4 c.	£13	
Algoa Bay, 30 cs.	21	
Trinidad, 3 t. 4 c.	12	
Singapore, 1 3	20	
Sulphur—		
E. London, 60 pks.	£35	
Algoa Bay, 3 t. 7 c.	25	
1 7	16	
Lisbon, 250 brls.	193	
Saltpetre—		
Syria, 10 t. 12 c.	£220	
Sydney, 2	43	
Camocin, 10	225	
Oporto, 3 15	76	
Melbourne, 1	22	
Gothenburg, 2 3	42	
Salammoniac—		
Hamburg, 19 c.	£33	
Gothenburg, 1 t. 4	41	
Saltcake—		
Antwerp, 115 t.	£201	
150	263	
Tartaric Acid—		
Wellington, 3 cs.	£23	
Newcastle, 3 c.	20	
Bombay, 4	34	
Cape Town, 5	39	
Montreal, 15	110	
Otago, 2	13	

LIVERPOOL.

Week ending June 7th.

Ammonium Sulphate—		
Antwerp, 30 t.	£360	
Barbadoes, 24 10 c.	288	
Las Palmas, 37	612	
Valencia, 77	924	
Nantes, 29 13	332	
Valencia, 76	1,032	
Las Palmas, 10	120	
Bordeaux, 8 2	110	
Demerara, 58 19	707	
Valencia, 50 11	3 700	
Antigua, 15 1	3 282	
Antimony Regulus—		
New York, 5 t. 14 c.	£350	
9 17	701	
Acetate of Lead—		
Colon, 9 c. 3 q.	£14	
Alum—		
Havana, 4 t. 17 c.	£24	
Vigo, 2 1	11	
Melbourne, 1 1 q.	8	
Canca, 1 10	5	
Calcutta, 25	125	
Colon, 9	5	
Cape Town, 2 3	11	
Calcutta, 101 7	608	
Rio Janeiro, 19	5	

Acetic Acid—		
Colon, 1 t. 3 c. 2 q.	£19	
Porto Alegre, 1 3 5		
1 3 5		
Albumen—		
San Francisco, 15 c.	£25	
Colon, 5 22		
Lisbon, 5 2 q.	20	
Ammonium Muriate—		
Philadelphia, 6 t. 10 c.	£149	
5 12	128	
New York, 5 5	130	
Philadelphia, 23 1	3 q. 550	
Ammonium Carbonate—		
Rotterdam, 3 c.	£6	
Venice, 4 1 q.	6	
Genoa, 1 t. 33		
6 1 10		
Gothenburg, 5 3 7		
Venice, 4 7		
Bleaching Powder—		
Antwerp, 27 cks.		
Baltimore, 100		
Boston, 156		
Naples, 3		
Vigo, 4		
Barcelona, 50		
Bombay, 6 cs.		
Boston, 161		
Havana, 21 brls.		
Naples, 15 pps.		
New York, 86 tcs.		
Rio Janeiro, 10 cs.		
Rotterdam, 41		
Bone Waste—		
Rouen, 9 t. 19 c.	£75	
Borate of Lime—		
Rotterdam, 10 t. 6 c.	1 q. £124	
New York, 106 3	1,234	
Borax—		
Savanna, 1 c.	£6	
Antwerp, 9 t. 15	1 q. 263	
Rotterdam, 166 cks.	200	
Antwerp, 12 cs.	36	
Rotterdam, 2 t. 4	66	
Halifax, 1 2 1	32	
Copperas—		
San Francisco, 10 t.	£21	
Pirous, 3 t. 4 c. 2 q.	8	
Caustic Soda—		
Adelaide, 35 dms.		
Bahia, 30	20 kgs.	
Baltimore, 200		
Barcelona, 20		
Dunedin, 1	36 cks.	
Genoa, 36		
Havana, 10		
Ibrail, 15		
Malta, 5		
Maranham, 10		
Marseilles, 5		
Melbourne, 35		
Montreal, 170		
New Orleans, 35		
New York, 350		
Palermo, 5		
Rosario, 30		
Rouen, 48		
Stettin, 54		
Sydney, 50		
Tampico, 250 kgs.		
Venice, 20		
Alexandria, 36		
Antwerp, 25		
Bilbao, 50 brls.		
Bombay, 10		
Calcutta, 178		
Corunna, 20		
Danzig, 50		
E. London, 10		
Ensenda, 25		
Fiume, 15		
Galatz, 30		
Ghent, 18		
Hamburg, 6		
Havana, 15		
Ibrail, 32		
La Guayra, 30		
Malaga, 26 pks.		
Marseilles, 15		
Melbourne, 25		
Montreal, 130		
Naples, 20		
Newfairwater, 60		
New York, 278		
Oporto, 30		
Passages, 25 brls.		
Penang, 100		
Pernambuco, 15		
Riga, 200		
St. Petersburg, 50		
Santander, 15		
Seville, 322		
Singapore, 12		

Caustic Soda—continued.		
Stettin, 95 dms.		
Trieste, 30		
Carbolic Solid—		
Rotterdam, 1 c. 1 q.	£9	
Carbolic Acid—		
Amsterdam, 5 c.	£32	
Philadelphia, 1 t. 10	81	
Rio Janeiro, 2 6	66	
Montreal, 11	30	
Philadelphia, 5	7	
Copper Precipitate—		
Antwerp, 24 t. 6 c.	£725	
Copper Sulphate—		
Rouen, 37 t. 3 c.	£943	
Bordeaux, 56 17	2,891	
Nantes, 16 19	721	
Madras, 10	240	
Bordeaux, 23 18	1,178	
Genoa, 2 8	40	
Marseilles, 204 13	2 q. 4,725	
Passages, 10	233	
Bordeaux, 5 7	134	
Havre, 5 2	107	
Genoa, 25 5	58	
Bari, 1	1	
Barcelona, 10	181	
Sydney, 2	47	
Genoa, 115	2,479	
Havre, 2	45	
Bordeaux, 58 3	1,397	
Mersyne, 10 10	15	
Venice, 15 9	2 273	
Bordeaux, 38 15	814	
Nantes, 49 5	1,221	
Barcelona, 7 2	177	
Bordeaux, 1 18	45	
Barcelona, 35 2	875	
Bordeaux, 110 9	2 2,750	
Valencia, 4 19	125	
La Union, 2	45	
Nantes, 112 16	1 2,800	
Calcium Chlorate—		
Constantinople, 2 t. 14 c.	£5	
Charcoal—		
Rouen, 20 t.	£100	
Hamburg, 30	150	
Rouen, 15	75	
Havre, 15	54	
15	54	
Chemicals (otherwise undescribed)		
Colon, 4 c. 2 q.	£9	
Rio de Janeiro, 1	5	
Talait, 7 2	19	
Disinfectants—		
Kingston, 4 c.	£6	
Bombay, 13 t. 17	166	
Baltimore, 20 cs.	88	
Madras, 1	5	
Calcutta, 2	39	
Shanghai, 3	8	
Epsom Salts—		
Calcutta, 100 kgs.		
Rio Janeiro, 50		
Ground Spar—		
Havre, 98 t. 13 c.	£738	
Rotterdam, 50 15	800	
Guano—		
Hamburg, 2 t.	£10	
Gypsum—		
New York, 10 t. 2 c. 2 q.	£30	
Lead Nitrate—		
Colon, 5 c. 1 q.	£1	
Magnesium Sulphate—		
Seville, 1 t. 10 c. 3 q.	£8	
Magnesia—		
Havana, 10 cs.		
San Francisco, 11 pks.		
Trieste, 2 cs.		
Manure—		
Valencia, 50 t.	£140	
St. Nazaire, 81 1 c. 2 q.	235	
Gr. Canary, 19 12	158	
Rouen, 50 3	460	
Magnesium Chlorate—		
Bombay, 5 t. 10 c.	£20	
Muriatic Acid—		
Ensenada, 1 t.	£13	
Magnesium Calcide—		
Trieste, 38 lbs.	£45	
Oxalic Acid—		
Barcelona, 5 t. 2 c. 2 q.	£165	
Calcutta, 6	11	
Potassium Carbonate—		
Corunna, 4 c. 2 q.	£5	
Pitch—		
Coquimbo, 100 brls.		
Potashes—		
Palermo, 3 t. 5 c.	£59	
Potassium Silicate—		
Amsterdam, 1 t. 2 c. 1 q.	£6	

Phosphorus—			
Vera Cruz, 1 t.	15 c.	2 q.	£177
Havana, 2			26
Potassium Chlorate—			
St. Petersburg, 2 t.	10 c.		£168
Hamburg, 3			136
Copenhagen, 7	10		350
New Fairwater, 2 t.	10		111
Riga, 5 t.			207
Corunna, 10			22
Gothenburg, 12			503
Hamburg, 10			22
Corunna, 1			56
St. Petersburg, 5			11
Havana, 4	8		190
Potassium Bichromate—			
Yokohama, 2 t.			£75
Hioho, 3	15 c.		145
Havre, 4	16		135
New York, 8		2 q.	61
Sodium Biorate—			
Antwerp, 5 t.	4 c.	1 q.	£156
Rotterdam, 2	13		80
Yokohama, 3	11	2	107
Superphosphate—			
Barbadoes, 14 t.			
Saltpetre—			
Matanzas, 7 c.	2 q.		£9
Salt—			
Antwerp, 136 t.			
Archangel, 574			
Boston, 200			
Faroe Islands, 182			
Ghent, 95			
Laurvig, 300			
Para, 35½	4 cs.		
Pernambuco, 200 t.			
Podpakt, 25			
Antwerp, 25			
Barbadoes, 100			
Bata, 10			
Bonny, 50			
Calcutta, 9,675			
Cameroon, 140			
Cape Coast, 6			
Cape Town, 20			
Ghent, 175			
Iceland, 96			
Montreal, 494			
New York, 70			
Para, 107	2 c.		
Quebec, 494			
Rotterdam, 324			
St. John, N.B., 6½			
Salt Pond, 692			
Savannah, 13½			
Trinidad, 13½			
Sodium Bicarbonate—			
Boca, 40 cks.			
B. Ayres, 30			
Calcutta, 1,000 kgs.			
Champerico, 40			
Hamburg, 22			
Melbourne, 54	220		
Montreal, 150			
New York, 33			
Rotterdam, 3	25		
St. Petersburg, 240			
San Francisco, 200			
Havana, 20			
Marseilles, 3			
Soda Ash—			
Baltimore, 245 cks.			
Boston, 850 bgs			
Monte Video, 7 brls.			
Montreal, 26 tcs.			
New York, 606			
Para, 6			
Philadelphia, 552			
Rio Janeiro, 50			
San Francisco, 11			
Baltimore, 28	34 cks.		
Bilbao, 50 brls.			
Boston, 67			
B. Ayres, 70			
Buffalo, 60			
Ghent, 8			
Malta, 30			
New York, 106			
Patras, 30			
Rio Janeiro, 180			
Santos, 2			
Sydney, 40			
Oporto, 10			
Soda Crystals—			
Calcutta, 50 brls.			
Gibraltar, 10			
St. John's, Nfld., 20 kgs.			
Sodium Silicate—			
Carthage, 7 cks.			
Corunna, 17 brls.			
Madras, 5 cks.			
Santander, 32			
Seville, 7			
Montreal, 39			

Sodium Silicate—continued.			
Salonica, 15 cks.			
Venice, 32			
Tar—			
Bahia, 40 brls.			
Sierra Leone, 15			
Sulphuric Acid—			
Kingston, 15 galls.			£7
Sugar of Lead—			
Rio de Janeiro, 5 c.	1 q.		£9
Sulphur—			
Rouen, 22 t.	19 c.		£104
New York, 25	1		110
Boston, 75	3		356
Porto Alegre, 10			7
Halifax, 7	10	1 q.	45
Madras, 5	10	2	42
New York, 18	6		82
" 225			1,005
Boston, 45			181
Rangoon, 2			9
New York, 50	2		225
Sodium Chlorate—			
Rotterdam, 1 t.			£35
Sodium Bichromate—			
Marseilles, 18 c.			£25
Saltpetre—			
Montreal, 50 t.	5 c.		£126
Philadelphia, 30			45
Salammoniac—			
Alexandria, 10 c.			£17
Beyrout, 12			21
Malta, 10			17
Constantinople, 3			5
Batoum, 2 t.	3 q.		70
New York, 4	18		168
Corunna, 5	9		
Alexandria, 2	5		78
Corfu, 5			1
Philadelphia, 7	11	1	205
Gothenburg, 6	2		11
Syria, 17	1		31
Superphosphate of Lime—			
Valencia, 50 t.			£125
Sodium Sulphate—			
Talcahuano, 2 t.	10 c.		£32
Hamburg, 2			10
Wellington, 2	2		16
Sodium Nitrate—			
Toronto, 2 t.			£16
Ancona, 19			154
Bar, 7	2 c.	1 q.	60
Antigua, 5	1		39
Malaga, 2			16
Pasages, 6			64
Malaga, 3	6	1	28
Montreal, 2			16
Tartaric Acid—			
Bahia, 8 c.			£58
Havana, 1 t.			155
Tar—			
Old Calabar, 5 brls			
Zinc Muriate—			
Kurrachi, 2 t.	16 c.		£50
Bombay, 1	15		24

TYNE.

Week ending June 10th.

Antimony—			
Copenhagen, 1 t.			
Rotterdam, 1			
St. Petersburg, 11 t.			
Ammonium Carbonate—			
Copenhagen, 6 c.			
Ammonium Sulphate—			
Rotterdam, 50 t.			
Aluminium—			
St. Petersburg, 305 lbs.			
Alkali—			
Rotterdam, 6 t.	7 c.		
St. Petersburg, 107 t.	15		
Gothenburg, 9 cks.			
Barium Chloride—			
St. Petersburg, 1 t.	2 c.		
Bleaching Powder—			
Copenhagen, 4 t.	1 c.		
Libau, 24	19		
Rotterdam, 16	2		
St. Petersburg, 10 t.			
" 45			
Gothenburg, 57 cks.			
Konigsberg, 15 t.	6 c.		
Hamburg, 67	13		
Antwerp, 73	6		
Malmo, 5			
Christiania, 30	2		
Copperas—			
Sundswall, 187 t.			
Tromsøe, 13 c.			

Caustic Soda—			
Rotterdam, 7 t.	5 c.		
Hamburg, 10	3		
Antwerp, 4	18		
Christiania, 4	19		
Copper Precipitate—			
Hamburg, 7 c.			
Litharge—			
Antwerp, 1 t.	12 c.		
Copenhagen, 1	3		
Magnesia—			
Hamburg, 19 c.			
Magnesium Carbonate—			
Libau, 19 c.			
Potassium Chlorate—			
Hamburg, 2 t.	4 c.		
Antwerp, 2	4		
Pitch—			
Antwerp, 50 t.			
Potassium Bichromate—			
Malmo, 5 t.	5 c.		
Sodium Chlorate—			
Hamburg, 5 t.			
Soda Ash—			
Konigsberg, 281 t.			
Seville, 2 t.	18 c.		
Hamburg, 9	3		
Odense, 2	16		
Soda—			
Aarhus, 20 t.	2 c.		
Frederikshaven, 9	11		
" 2	3		
Malmo, 5	8		
Copenhagen, 26	18		
Esbjerg, 6	19		
Groto, 1	1		
Sundswall, 59	6		
Kolding, 33			
Tromsøe, 1	12		
Wasa, 12			
Helsingfors, 3	6		
Svendborg, 19	16		
Salt—			
Esbjerg, 1 c.			
Sodium Nitrate—			
Huelva, 91 t.	14 c.		

GLASGOW.

Week ending June 12th.

Alkali—			
Dunedin, 3 t.	4 c.		£24
Ammonium Sulphate—			
Cullera, 55 t.	5½ c.		£611
Caustic Soda—			
Dunedin, 103½ c.			£46
Copper Sulphate—			
Italy, 23½ t.			508
Chemicals (otherwise undescribed)			
Italy, 5 c.			£65
Dyestuffs—			
Turmeric			
Montreal, 34 c.			£23. 10s.
Fustic			
Montreal, 13½ c.			£27
Alizarine			
Dunedin, 660 lbs.			£44
Glucose—			
Cape Town, 6 t.	14½		£120
Manure—			
Antigua, 110 c.			£39
Pearl Ash—			
Dunedin, 29 c.			£27
Phosphorus—			
Dunedin, 1 t.	14½ c.		£160
Potassium Bichromate—			
Dunedin, 23½ c.			£42
" 3 t.	½ c.		24
Rotterdam, 69 cks.			620
Calcutta, 11 c.			£20 15s.
Italy, 13 t.	13½		£461
" 14			22
" 81½			150
" 295			551
Paraffin Wax—			
Dunedin, 10 t.	1½ c.		£500
Antwerp, 100			133
Italy, 3	9		87
Cape Town, 5	2		183
Soda Ash—			
Dunedin, 7 t.	17½ c.		£53
Sulphuric Acid—			
Madras, 9 t.	2½ c.		£47 15s.
Sodium Bichromate—			
Italy, 33 t.	11 c.		£887
Quebec, 314			439

HULL.

Week ending June 10th.

Alkali—			
Bar, 2 cks.			
Bergen, 12			
Trieste, 61			
Bleaching Powder—			
Trieste, 4 cks.			
Venice, 25			
Borax—			
Helsingfors, 1 ck.			
Hango, 2			
Bone Size—			
Bremen, 10 cks.			
Harlingen, 28			
Rotterdam, 5			
Benzole—			
Dunkirk, 24 cks.			
Caustic Soda—			
Abo, 50 drms.			
Helsingfors, 52			
Hango, 26			
Rotterdam, 20			
Reval, 125			
Chemicals (otherwise undescribed)			
Antwerp, 36 cs.	2 cks.		
Amsterdam, 161			
Bremen, 1			
Bar, 9	4		
Christiania, 163 lbs.	24		
Drontheim, 2			
Dunkirk, 2 cs.			
Gothenburg, 639 lbs.	39 cs.	20 cks.	
Helsingfors, 31 cks.			
Hamburg, 266 cs.	41	3	
Hango, 5			
Libau, 25			

PRICES CURRENT.

WEDNESDAY, JUNE 18, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

s stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

	£	s.	d.
5 % and 40 % per cwt.	7/-	&	12/3
acial			65/-
S.G., 2000°	0	12	9
82 % nett per lb.	0	0	6½
.. .. .	0	0	3¼
.. .. .	0	0	8
(Tower Salts), 30° Tw. per bottle	0	2	11
(Cylinder), 30° Tw.	0	0	2
Tw. per lb.	0	0	1¼
.. .. .	0	0	3¼
.. .. . nett	0	1	1½
ic (fuming 50 %) per ton	15	10	0
(monohydrate)	5	10	0
(Pyrites, 168°)	3	2	6
(, 150°)	1	4	6
(free from arsenic, 140/145°)	1	7	6
ous (solution)	2	15	0
(pure) per lb.	0	1	0½
.. .. .	0	1	2½
white powdered per ton	13	0	0
se lump)	4	17	6
Sulphate (pure)	5	0	0
.. .. . (medium qualities)	4	10	0
m per lb.	0	15	0
, 880=28° per lb.	0	0	3
=24°	0	0	1¼
Carbonate nett	0	0	3¼
Muriate per ton	23	0	0
.. .. . (sal-ammoniac) 1st & 2nd	37/-	&	35/-
Nitrate per ton	40	0	0
Phosphate per lb.	0	0	10½
Sulphate (grey), London per ton	11	1	3
.. .. . (grey), Hull	11	1	3
Oil (pure) per lb.	0	0	10½
Salt	0	0	9
.. .. . per ton	75	0	0
.. .. . (tartar emetic) per lb.	0	1	1
.. .. . (golden sulphide)	0	0	10
Chloride per ton	8	5	0
Carbonate (native)	3	12	6
Sulphate (native levigated)	45/-	to	75/-
ng Powder, 35 %	4	17	6
Liquor, 7 %	2	10	0
ide of Carbon	13	0	0
am Acetate (crystal) per lb.	0	0	6
Chloride per ton	2	2	6
lay (at Runcorn) in bulk	17/6	to	35/-
Dyes:—			
ine (artificial) 20 % per lb.	0	0	9
nta	0	3	9
ar Products			
racene, 30 % A, f.o.b. London per unit per cwt.	0	1	5
ol, 90 % nominal per gallon	0	3	9
50/90	0	2	9
olic Acid (crystallised 35°) per lb.	0	0	7¼
.. .. . (crude 60°) per gallon	0	2	2
ote (ordinary)	0	0	2½
.. .. . (filtered for Lucigen light)	0	0	3
.. .. . Naphtha 30 % @ 120° C.	0	1	4
.. .. . Oils, 22° Tw. per ton	3	0	0
.. .. . f.o.b. Liverpool or Garston	1	8	0
nt Naphtha, 90 % at 160° per gallon	0	1	9
ren Oils (crude)	0	0	2½
(Chili Bars) per ton	59	10	0
Sulphate	22	0	0
Oxide (copper scales)	57	10	0
ie (crude)	30	0	0
.. .. . (distilled S.G. 1250°)	60	0	0
.. .. . nett, per oz.	0	0	9
.. .. . per ton	1	10	0
lphate (copperas)	2	0	0
lphide (antimony slag)	14	10	0
heet) for cash	15	10	0
itharge Flake (ex ship)	24	0	0
etate (white	18	0	0
.. .. . (brown	19	0	0
arbonat (white lead) pure	22	0	0
itrate	22	0	0

	£	s.	d.
Lime, Acetate (brown)			7 7 6
.. .. . (grey) per ton	13	0	0
Magnesium (ribbon and wire) per oz.	0	2	3
.. .. . Chloride (ex ship) per ton	2	5	0
.. .. . Carbonate per cwt.	1	17	6
.. .. . Hydrate	0	10	0
.. .. . Sulphate (Epsom Salts) per ton	3	0	0
Manganese, Sulphate	17	10	0
.. .. . Borate (1st and 2nd) per cwt.	60/-	&	42/6
.. .. . Ore, 70 % per ton	4	10	0
Methylated Spirit, 61° O.P. per gallon	0	2	2
Naphtha (Wood), Solvent	0	3	11
.. .. . Miscible, 60° O.P.	0	4	3
Oils:—			
Cotton-seed per ton	22	10	0
Linseed	26	0	0
Lubricating, Scotch, 890°—895°	7	5	0
Petroleum, Russian per gallon	0	0	5½
.. .. . American	0	0	5¼
Potassium (metal) per oz.	0	3	10
.. .. . Bichromate per lb.	0	0	4
.. .. . Carbonate, 90% (ex ship) per ton	19	10	0
.. .. . Chlorate per lb.	0	0	4½
.. .. . Cyanide, 98%	0	2	0
.. .. . Hydrate (Caustic Potash) 80/85 % per ton	22	10	0
.. .. . (Caustic Potash) 75/80 %	21	10	0
.. .. . (Caustic Potash) 70/75 %	20	15	0
.. .. . Nitrate (refined) per cwt.	1	2	6
.. .. . Permanganate	4	2	6
.. .. . Prussiate Yellow per lb.	0	0	9½
.. .. . Sulphate, 90 % per ton	9	10	0
.. .. . Muriate, 80 %	7	15	0
Silver (metal) per oz.	0	4	0½
.. .. . Nitrate	0	2	9
Sodium (metal) per lb.	0	4	0
.. .. . Carb. (refined Soda-ash) 48 % per ton	6	0	0
.. .. . (Caustic Soda-ash) 48 %	5	0	0
.. .. . (Carb. Soda-ash) 48 %	5	5	0
.. .. . (Carb. Soda-ash) 58 %	6	5	0
.. .. . (Soda Crystals)	2	17	6
.. .. . Acetate (ex-ship)	16	0	0
.. .. . Arseniate, 45 %	11	0	0
.. .. . Chlorate per lb.	0	0	6¼
.. .. . Borate (Borax) nett, per ton	29	0	0
.. .. . Bichromate per lb.	0	0	3
.. .. . Hydrate (77 % Caustic Soda) (f.o.b.) per ton	9	15	0
.. .. . (74 % Caustic Soda)	9	0	0
.. .. . (70 % Caustic Soda)	8	10	0
.. .. . (60 % Caustic Soda, white) (f.o.b.)	7	10	0
.. .. . (60 % Caustic Soda, cream)	7	5	0
.. .. . Bicarbonate	5	15	0
.. .. . Hyposulphite	5	10	0
.. .. . Manganate, 25%	9	0	0
.. .. . Nitrate (95 %) ex-ship Liverpool per cwt.	0	8	1½
.. .. . Nitrite, 98 % per ton	28	0	0
.. .. . Phosphate	15	15	0
.. .. . Prussiate per lb.	0	0	7¼
.. .. . Silicate (glass) per ton	5	7	6
.. .. . (liquid, 100° Tw.)	3	17	6
.. .. . Stannate, 40 % per cwt.	2	2	6
.. .. . Sulphate (Salt-cake) per ton	1	7	6
.. .. . (Glauber's Salts)	1	10	0
.. .. . Sulphide	7	15	0
.. .. . Sulphite	5	5	0
Strontium Hydrate, 98 %	8	0	0
Sulphocyanide Ammonium, 95 % per lb.	0	0	7¼
.. .. . Barium, 95 %	0	0	5¼
.. .. . Potassium	0	0	8
Sulphur (Flowers) per ton	7	10	0
.. .. . (Roll Brimstone)	6	0	0
.. .. . Brimstone : Best Quality	4	7	6
Superphosphate of Lime (26 %)	2	12	6
Tallow	25	10	0
Tin (English Ingots)	100	0	0
.. .. . Crystals per lb.	0	0	6½
Zinc (Spelter) per ton	23	10	0
.. .. . Chloride (solution, 96° Tw.	6	0	0

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Notices.

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Communications for the Editor, if intended for insertion in the current week's issue, should reach the office not later than **Tuesday Morning.**

Articles, reports, and correspondence on all matters of interest to the Chemical and allied industries, home and foreign, are solicited. Correspondents should condense their matter as much as possible, write on one side only of the paper, and in all cases give their names and addresses, not necessarily for publication. Sketches should be sent on separate sheets.

We cannot undertake to return rejected manuscripts or drawings, unless accompanied by a stamped directed envelope.

Readers are invited to forward items of intelligence, or cuttings from local newspapers, of interest to the trades concerned.

As it is one of the special features of the *Chemical Trade Journal* to give the earliest information respecting new processes, improvements, inventions, etc.; bearing upon the Chemical and allied industries, or which may be of interest to our readers, the Editor invites particulars of such—when in working order—from the originators; and if the subject is deemed of sufficient importance, an expert will visit and report upon the same in the columns of the *Journal*. There is no fee required for visits of this kind.

We shall esteem it a favour if any of our readers, in making inquiries of, or opening accounts with advertisers in this paper, will kindly mention the *Chemical Trade Journal* as the source of their information.

Advertisements intended for insertion in the current week's issue, should reach the office by **Wednesday morning** at the latest.

Advertisements.

Prepaid Advertisements of Situations Vacant, Premises on Sale or To be Let, Miscellaneous Wants, and Specific Articles for Sale by Private Contract, are inserted in the *Chemical Trade Journal* at the following rates:—

30 Words and under

Each additional 10 words

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30 Words and under

Each additional 10 words

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THE LABOUR MARKET.

FOR the purposes of reasoning and argument, labour be considered in pretty much the same way as consider more tangible commodities. It is true that the nature of the case its treatment must in some respects differ from that of these, but in the few remarks that I we regard labour, from a broad and general view, as something of which there is always a supply corresponding more or less approximately to an equally increasing demand something that is subject to the same fluctuations in as bleaching powder or soda crystals—something that for its artificial regulation the same inducements that called into being a Salt Union or a Whiskey Trust.

We are far from lacking sympathy for the working man rather, as we should call him here, the vendor of labour. We are strongly of opinion that his prosperity and prosperity of his country mean one and the same thing: our sympathy does not prevent us from seeing his shortcomings, and lamenting the unbusinesslike manner in which he conducts the sale of that one and only article that he has to dispose of. From the moment when the first faint streak of light of activity gave evidence last year of the dawn of an improvement in trade, the mind of the labourer began to ferment within him, and the anxiety that he has displayed ever since to raise the price of his wares to our thinking, been out of all proportion to what the circumstances of the case would justify. When a man, who has a monopoly of an article, refuses to sell except at a figure which prohibits its use, it is manifest that he defeats his own end, and this seems to us to be just the position that the labourer of to-day is occupying. His disputes with customers (*i.e.*, with his employers) have become monotony by reason of their multitude. Concessions have only served to increase his demands. Already the young bud of improvement has received a severe check, and the probability of its coming to flower grow less day by day. To-day we have the strike, to-morrow the concession, and the day after the stoppage of the mill or factory through inability to produce at the ruling prices. The political agitator—the glib-ton misleader of the people—has doubtless much of this to answer for; but it is a great reflection upon the common sense of working men of the country that they so persistently refuse to see the things that have so much importance for them, and are so patent to everyone but themselves. Of what use is a five, ten, or twenty per cent. rise of wages if it drives work away from the factory and sets the hands adrift? The present seems to us a most ill-advised time for the labourer to go into the "striking" business. That business has been over-done. The only outcome that is likely to result from it is the hastening of the transfer of what is left of the trade to the shores of our neighbours, and a return of distress that was so prevalent a short time since.

CANADIAN SUGAR.—Agents of an English syndicate at Montreal are trying to buy the sugar interest of the Dominion.

URGH INTERNATIONAL EXHIBITION.

(BY OUR SCOTCH REPRESENTATIVE.)

EDINBURGH, June 23rd.

Edinburgh's second "International," the first having taken so recently as 1886, preceded at short distances of time by "Forestry" and "Fisheries" of a minor and tentative character. These latter were popular and successful financially, and the "International" also fully justified the greater scope of the under-though the surplus, as rather too hastily announced at the usually dwindled, under a squarer and more leisurely balancing and adjusting accounts, to a comparatively educible minimum. Glasgow's great show followed realising an undoubted success in every way, with a handsome surplus, and no doubt enticing Edinburgh to an effort which is now running its course. It was thrown the beginning of last month in a woefully unfinished and now, after nearly two months of struggling into order, short of the completing touches, and some of the leading are not yet under way. It was to have been an Exhibition of Appliances only, as at first schemed; but the promoters enlarged their views as the work was proceeding, and it is in the present somewhat unsatisfactory condition of the display is due. The Exhibition, which stands on ground adjacent to the south-west of the city, contains many things well examined, but exhibitors and the examining public alike great disadvantages. Between the Machinery Hall and the courts and annexes, there is an abundance of floor space; quite promiscuously apportioned, with stand numbers not even in sequence at consecutiveness, and if a particular exhibit be wanted, or two may be expended in the search, the catalogue, with its show of order, proving rather a hindrance than otherwise. No classification, properly speaking, and all that the critic can take up a feature here and there, and get through his task the best way he can. The purely chemical examples scanty indeed, but a number of the general exhibits are of interest to the chemical manufacturer, and these, or a part of them, will be included in the mention which is to follow. Great English manufacturers of chemicals, so well represented at Glasgow Exhibition two years ago, have practically put in no notice at all; and even of the Scotch contingent, about the only conspicuous example is that of

YOUNG'S PARAFFIN AND MINERAL OIL COMPANY,

West Court, stand 633. This stands on the floor by itself, unadorned, and in general appearance and arrangement a replica of the firm's exhibit at Glasgow, which many visitors will remember. It provides a very complete illustration of the fecundity of the rising-looking shale block in the production of numerous and varied paraffin derivatives in marketable form, including all kinds of naphthas, scale, wax, solid burning paraffin, fruit and flowers in tapers, candles, and vestas, also sulphate of ammonia and the other by-products of this great industry. These are grouped in a kind of composite trophy, surmounted by busts, in refined wax, of Sir Lyon Playfair and David Landale. Accessory articles of the exhibit are Young's lamps, stoves, and other apparatus for cooking, and heating by means of paraffin oil and solid fuel, for the most part manufactured at the lamp works of the firm in England. Adjoining the foregoing (Stand 634) is a case of lar form and of remarkable effectiveness by

ICE'S PATENT CANDLE COMPANY, BATTERSEA, LONDON.

consists largely of paraffins in the marketable forms of candles, tapers, lights, oils, &c.; but includes also specimens of the soap manufactured in toilet, sanitary and household sorts, stearine samples &c., forming on the whole a very interesting and instructive grouping of the results in this growing department of industrial production.

One of the most striking of the features of the Exhibition, for the general eye at least, is to be found in the Boiler House, where five of the Galloways Ltd., Manchester, are constantly at work, generating steam for the whole of the uses of the building. This is a magnificent sight in its way, giving the onlooker at once an impression of the perfection to which this noted firm has carried their technology. These boilers, each measuring 30 feet by 8 ft. diameter, were recently acquired, as they stand, by the

NORTH BRITISH RUBBER COMPANY, EDINBURGH,

near Castle Mills Works, to which they will be removed at the end of October. This firm are also exhibitors (West Court), showing india-rubber products for chemical, mechanical, and manufacturing purposes, and including articles of clothing in great variety, the

whole composing an illustration which will repay examination. Another illustration of india-rubber adaptability of a less general character is to be found in the

SPHINCTER GRIP ARMoured HOSE COMPANY,

exhibit, Machinery Hall, consisting of their now well-known flexible india-rubber "indestructible" hose; a remarkable contrivance, and, to the eye, giving strong promise of satisfactory endurance, if not of absolute indestructibility.

The Machinery Hall contains the bulk of the electrical exhibits, a few of which may be noticed here.

WOODHOUSE AND RAWSON, UNITED, LTD.,

of London, Manchester, and Bradford, who, in addition, are the producers of the high candle-power incandescent lamps, illuminating the grand stand in the grounds, show electric lamps, lanterns, bells, switches, wire testers, railway and post office transmitters and receivers in great variety, including all electrical appliances within the very wide range embraced by the firm.

Messrs. Woodhouse and Rawson also exhibit Horn's Electrical Tachometer—for indicating directly the speed of a rotating shaft. The action of this is founded upon Arago's discovery, of the currents set up in a copper disc when rotating in a magnetic field. The disposition of the instrument is such that its calibration is not affected by a variation in the strength of the permanent magnet employed, while its sensitiveness is said to be superior to any form of centrifugal speed indicator. It is specially useful for marine and railway purposes, where it is subject to shocks which have practically no effect upon it. Its sensitiveness enables it to be specially useful in detecting slipping belts, which are a fertile source of loss of power in mills, etc.

KING, MENDHAM AND CO., BRISTOL,

have an excellent little case showing their "Wimshurst" influence electrical, glass-plate, and ebonite cylinder machines, and other electrical apparatus.

PRIESTMAN BROTHERS, HULL,

engineers, have, at stand 59a, an exhibit the purpose of which, in its entirety, is to demonstrate a complete electric light installation, as worked by the Priestman oil engine, suitable for mills, factories, stations, mansions, and other small aggregations of working or dwelling populations. The main feature is the engine itself, of 2 h.p., apparently a sound piece of workmanship, and, in form, similar to the gas engine type. One of these (9 h.p. nominal) is in a house of its own on the grounds, driving a dynamo for the experimental search light on the main entrance tower.

At stand 134, there are three samples of the Blackman air propeller, one of them combined with motor for driving, by electric current, a new patent of the proprietors, the

BLACKMAN AIR PROPELLER VENTILATING COMPANY, LONDON.

Another at work shows the facilities of the Blackman fan in exhausting and propelling air in buildings, and for cooling and drying purposes.

Close by, are found some fine specimens of machine, engine, and other beltings by the

ROSSENDALE BELTING COMPANY,

Mosley-street, Manchester, including woven hair belting with patent edge, sewn cotton belting, carrying belts for collieries, dredgers, factories, &c., and samples also of the patent horse tracing belts of the firm. These will be examined with interest by the visitor of manufacturing proclivities; and a portion of this passing attention is also paid to the stand adjoining, smaller, but including some belting specimens of merit by the proprietors, the

GANDY BELT MANUFACTURING COMPANY, LIVERPOOL.

Here and there are a few illustrations of products in paints, varnishes, &c., and also in practical painting and varnishing.

THE PATENT LEAD AND ZINC-WHITE COMPANY, CAMBERWELL,

London, have, in the North Court, six doors finished (including artistic decorations) with their patent non-poisonous paints. Each is in a colour of its own, although treated in the same design, and they form an exhibit which must be, and is, very interesting to the trade. The patentees assert that these coatings are proof against the most virulent of chemical and manufacturing gases.

THE YORKSHIRE VARNISH COMPANY, RIPON AND LONDON,

have a large and very attracting case (same court), containing all sorts of varnishes for railway, coach, house, ship, and cabinet making work; also some Yorkshire art and other enamels, and wood stains, such as naphthaline, &c.

Closely allied to the same line are

J. AND D. MACNAIR AND CO., GLASGOW AND MANCHESTER

(331a), with their fine samples of the various gums used in the manufacture of varnishes and polishes, also of wood naphthas and shellacs. This is a good case, but, like many others, sadly out of its proper order in the numbering, and very difficult of discovery by any one trusting to the offices of the catalogue alone.

WALKERS, PARKER AND CO., NEWCASTLE

(131), show some fine specimens of their products, including red, white, orange and other leads, litharge and lead in pigs, sheets and pipes.

STOREY AND CO., LANCASTER

(627), are also well to the front with their makes in colours, sizes, manganese dryers, size softeners, &c. Stand 148a

A. B. FLEMING AND CO., EDINBURGH,

is very interesting in its varied selections from the list of this well known firm, including inks of all kinds, colliery greases, solidified and other oils, lubricators, and the new mineral fibre "Azolet," rock and ground. At stand 625, West Court, there are good samples of borax and boracic acid, also borax crystals, by W. G. PURSELL AND CO., LEITH.

ASPINALL, ASPINALL AND CO., NEW CROSS, LONDON,

at 358, same Court, show, within a large and excellently-arranged case, some samples of enamel and water paint which are worth looking at. The above-named comprise about the whole of the gleanings within the chemical and allied category, and, except in general excellence of individual display, it is not by any means a strong muster; but the fault lies not with the exhibiting manufacturers of the country, and is to be found in the primary haste, subsequent indecision, and final rush and hurry, amid which this rather ramshackle thing in exhibitions has been got together. Probably attempting are petition so soon after 1886 and 1888 was taxing the complaisance of exhibitors and visitors overmuch; but the radical change, while in progress, from a mere departmental exhibition of electrical appliances and discoveries, to the International and Comprehensive Industrial scope, was a fatal vacillation, which introduced all the mischief, and has resulted in perhaps the most slipshod achievement of the kind ever put in evidence since the institution of the "Exhibition" was first invented. It was a case of swopping horses when crossing the stream, and the result forms the strongest confirmation of the soundness of the American adage, which forbids that very risky operation.

The foreign exhibitors are housed in the East Court, but their exhibits are of very miscellaneous description, with hardly anything applicable to our present purpose of special review. There is a railway annexe off the machinery hall, which is, perhaps, the most compact and most interesting part of the exhibition. Nowhere else has classification been successfully practised. It comprises samples of locomotives, wagons and carriages, from the earliest to the most recent times. Although some are old friends at past shows, they are welcome here as links in the line of illustration from primitive to perfect types. The grounds of the exhibition are extensive, with various electrical, ship, water-gliding, and telpherage miniature railways, all more or less backward, but the *raree-show* element is otherwise too abundant, making the area not unlike an ordinary fair ground, with its shouting of excited touters; and the visitor finds he can see little there unless willing to disburse unlimited extras.

STRIKING TO STRIKERS.

THE recent strike of stokers at the South Metropolitan Gas Company's works has developed a phase of the labour question which is not without importance. It is well known that when the retort houses were deserted by what we may call the trained stokers, many of the vacant places were filled by raw recruits from the country. These new men did not pretend to be skilled in the art of filling retorts, but they were willing to be taught; and under the South Metropolitan Company's engineers and foremen they learned their lesson thoroughly and quickly. The man who can handle a spade in the field does not require long to learn how to handle a shovel in the retort-house—a simple fact which the strike leaders thought fit to omit from their calculations; with dire consequences to the misguided men who quietly followed their advice. The agricultural labourer soon became a competent gas stoker—with the result that he has now got two strings to his bow, while the stoker who boasted that he was so skilled that no outsider could fill his place, has none at all. With the recurrence of the summer season the agricultural-stoker gives up stoking and betakes himself to agriculture; when the winter returns he will forsake the frozen fields for the warmer climate of the retort-house. Between agriculture and gas-making his whole time may be occupied—to his own advantage and to the confusion of the man who prefers to fill retorts for six months of the year and loaf about during the remaining six. Many of the men employed by the South Metropolitan Company during the past winter are now returning to their country labours, and each is provided with an addressed envelope, to be used should he desire to return to gas-stoking when winter comes round. The possibilities of a dual occupation such as is here indicated are, we think, susceptible of a development that cannot but result in good for the workman.—*The Gas World*.

PERMANENT CHEMICAL EXHIBITION

THE proprietors wish to remind subscribers and their generally that there is no charge for admission to the Exhibition. Visitors are requested to leave their cards, and will confer a favour by making any suggestions that may occur to them in the direction of promoting the usefulness of the Institution.

JOSEPH AIRD, GREATBRIDGE.—Iron tubes and coils of all kinds of Ammonia Stills, Green's Patent Scrubber, Gasometers, Plant generally.

BLACKMAN VENTILATING CO., LONDON.—Fans, Air Pumps, Ventilating Machinery.

GEO. G. BLACKWELL, LIVERPOOL.—Manganese Ores, French Chalk. Importers of minerals of every description.

BRACHER AND CO., WINCANTON.—Automatic Stills, and Mixing Machinery for Dry Paints, Powders, &c.

BRUNNER, MOND AND CO., NORTHWICH.—Bicarbonate of Soda Ash, Soda Crystals, Muriate of Ammonia, Sulphate of Ammonia, Sesqui-Carbonate of Ammonia.

BUCKLEY BRICK AND TILE CO., BUCKLEY.—Fireclay wares of all kinds—Slabs, Blocks, Bricks, Tiles, "Metalline," &c.

CHADDERTON IRON WORKS CO., CHADDERTON.—Steam Drums, Steam Traps (McDougall's Patent).

W. F. CLAY, EDINBURGH.—Scientific Literature—English, German, American. Works on Chemistry a speciality.

CLAYTON ANILINE CO., CLAYTON.—Aniline Colours, Aniline Benzole, Toluole, Xylole, and Nitro-compounds of all kinds.

J. CORTIN, NEWCASTLE-ON-TYNE.—Regulus and Brass Taps, "Non-rotative Acid Valves," Lead Burning Apparatus.

R. DAGLISH AND CO., ST. HELENS.—Photographs of Chemical Processes—Blowing Engines, Filter Presses, Sludge Pumps, &c.

DAVIS BROS., MANCHESTER.—Samples of Products from chemical processes—Coal Distilling, Evaporation of Pastry, Treatment of waste liquors from mills, &c.

R. & J. DEMPSTER, MANCHESTER.—Photographs of Gas Holders, Condensers, Purifiers, &c.

DOULTON AND CO., LAMBETH.—Specimens of Chemical Stills, Condensers, Receivers, Boiling-pots, Store-jars, &c.

E. FAHRIG, PLAISTOW, ESSEX.—Ozonised Products. Bleached Esparto-Pulp, Ozonised Oil, Ozone-Air, Lime, &c.

GALLOWAYS, LIMITED, MANCHESTER.—Photographs of Locomotive Boilers, and an installation of 1,500-h.p.

GRIMSHAW BROS., LIMITED, CLAYTON.—Zinc Compounds. Materials, India-rubber Chemicals.

JEWSBURY AND BROWN, MANCHESTER.—Samples of Aerated Waters, &c.

JOSEPH KERSHAW AND CO., HOLLINWOOD.—Soaps, Greases, Varnishes of various kinds to suit all requirements.

C. R. LINDSEY AND CO., CLAYTON.—Lead Salts, (Acetate, etc.) Sulphate of Copper, etc.

CHAS. LOWE AND CO., REDDISH.—Mural Tablet-makers of Crystals, Cresylic and Picric Acids, Sheep Dip, Disinfectants.

MANCHESTER ANILINE CO., MANCHESTER.—Aniline Samples of Dyed Goods and Miscellaneous Chemicals, organic and inorganic.

MELDRUM BROS., MANCHESTER.—Steam Ejectors, Exhaust Silents, Boiling Jets, Air Compressors, and Acid Lifters.

E. D. MILNES AND BROTHER, BURY.—Dyewoods and Imitation Extracts. Also samples of dyed fabrics.

MUSGRAVE AND CO., BELFAST.—Slow Combustion Stoves. of all kinds of heating appliances.

NEWCASTLE CHEMICAL WORKS COMPANY, LIMITED, NEWCASTLE-ON-TYNE.—Caustic Soda (ground and solid), Soda Ash, Refined Sulphur, etc.

ROBINSON, COOKS, AND COMPANY, ST. HELENS.—Drawing and Erecting their Gas Compressors and Vacuum Pumps, fitting Pilkington and Forrest's patent Valves.

J. ROYLE, MANCHESTER.—Steam Reducing Valves.

A. SMITH, CLAYTON.—India-rubber Chemicals, Rubber Sulphide of Carbon, Solvent Naphtha, Liquid Ammonia, Disinfecting Fluids.

WORTHINGTON PUMPING ENGINE COMPANY, LONDON.—Machinery. Speciality, their "Duplex" Pump.

JOSEPH WRIGHT AND COMPANY, TIPTON.—Berryman Feeder Heater. Makers also of Multiple Effect Stills and Softening Apparatus.

JID VOLATILE NICKEL COMPOUND.

seems destined to startle the modern chemical world. being a comparative rarity, except on plated goods, it has been a laboratory material but a little while ago, then its consideration as an element was impugned, and now it is both re-instated and its vapour density, for the first time. These results have followed from the researches of Mr. Quincke, and Langer, which were recently made the paper before the Chemical Society. The investigation led to the need for removing carbonic oxide from producer gas to use it in the gas battery described in Mr. Mond's address at the annual meeting of the Society of Chemical Engineers, nickel and cobalt being found to effect this object. In this direction, it has been found that a direct compound of carbonic oxide, viz., $\text{Ni}(\text{CO})_4$ exists, the new substance is a colorless liquid, volatile at ordinary temperatures, boiling at a specific gravity of 1.3185 at 17°C , soluble in alcohol, and chloroform, and not acted upon by dilute acids and its vapour explodes when heated to 60°C . Its vapour is estimated by Victor Meyer's method is 6.01, instead of the value, 5.9; from this, the atomic weight of nickel is found to be the metal itself can be obtained from it in the form of metallic mirrors of such purity as to form a splendid raw material for the re-determination of the atomic weight. The method proposed by reducing nickel oxide from this source by heating in electrolytic hydrogen, was 58.61, corresponding closely to the previously accepted, viz., 58.52. This proves conclusively and Schmidt's assertion that the metal hitherto considered nickel is contaminated with another element, and that all analyses of it consequently need revision, cannot be sustained, as nickel as we have always known it among the elements. The substitution of the compound $\text{Ni}(\text{CO})_4$ is still the subject of the speculation, Mr. Mond declined to be "drawn" on this subject, but the temptation to represent it by some fascinating ring name, without contenting himself at present with a statement of the connection with this curious body, it is to be noted that no cobalt compound can be obtained, thus establishing another point of differentiation and separation between it and its twin brother,

THE ARECA-NUT.

RECENTLY published paper on "The Narcotics and Spices of the East," which was read by Dr. Dymock before the Anthropological Society of Bombay, contains, according to the Calcutta *man*, some interesting information about the areca-nut, which is called *supari* by natives, and usually betel-nut by Europeans. The nut is so well known, it has only been scientifically treated in comparatively recent years. The palm on which it is supposed to be indigenous in the Malayan peninsula and but is now only known in the cultivated state. Few persons have any idea of the consumption of the nut in India; but, as a matter in addition to the vast quantity locally produced (Dr. Dymock estimates that 10,000,000 people eat it every day of the year), there is an annual export of about 30,400,000 lbs. from Ceylon, the Straits Settlements, and Malacca. On the other hand, there is a small annual export of about 500,000 lbs. for the use of Indians living in Zanzibar, Aden, China, and other countries. It is well known to be that the fresh nuts have intoxicating properties and produce a strong effect, and that the nuts from certain trees possess these properties to an unusual extent, and even retain them when dry. These intoxicating properties are much diminished by heat, and as the nuts which are apt to be mixed up with the common sort, many of us people decline to use any except the red nuts of commerce, which have all undergone a process of cooking. Dr. Dymock inclines to the opinion that the original wild nut must have been an intoxicant, as the unripe nuts of the best trees produce slightly intoxicating effects. The betel-leaf or *pan*, with which natives eat the areca-nut, is highly esteemed, and its thirteen properties are enumerated in the ancient books of the Hindus. Until very recently the nut was used by European medical writers to be simply astringent, and the cooling properties of the *bira* or *pan*, the universal native pledge of ship, were supposed to be due to the leaf, and to the spices which are put into the *pan*. But the process of organic chemistry led to the discovery of organic properties in the nut, the active principle of which, if injected under the skin of rabbits and cats, causes death in a few minutes. At the same time the essential oils of the leaves have been found to be highly beneficial in catarrhal affections and throat inflammations.

THE ANALYSIS OF FATS.

THE free fatty acids are determined by extracting the total fats with petroleum ether, and phenolphthalein is used as the indicator in the titration with alkali; the results are calculated as oleic acid. In order to judge of the rancidity of fats and oils of commerce by the amount of free acids they contain, it is necessary to know the percentage of free acids in the pure products. The results of experiments in this direction are shown in the following table, both for oils and oil cakes. The numbers given are the mean values found:

	100 parts contain		
	Free fatty acids.	Total fats.	Per cent. of free fatty acids on total fat.
I.—Oils.			
Rape (Brassica rapa).....	0.42	37.75	1.10
Cabbage (Brassica campestris) ..	0.32	41.22	0.77
Poppy (Papaver somniferum)	3.20	46.90	6.66
Earth nut (Arachis hypogaea)			
(a) seed	1.91	46.09	4.15
(b) outside pale yellow husk ..	1.91	4.43	43.10
Sesame (Sesamum orientale)	2.21	51.59	4.59
Castor (Ricinus communis)	1.21	46.32	2.52
Palm nut (Elais guineensis) (with 6 per cent. husk)	4.19	49.16	8.53
Coprah (Cocos nucifera)	2.98	67.49	4.42
II.—Cakes.			
Rape	0.93	8.81	10.55
Poppy	5.66	9.63	58.89
Earth nut	1.42	7.65	18.62
Sesame	6.15	15.44	40.29
Palm nut	1.48	10.39	14.28
Earth nut meal (extracted)	1.55	18.68	8.29
Cocoa	1.31	13.11	10.51
Linseed	0.75	8.81	9.75
Castor	1.27	6.53	20.07

The oils obtained by pressing only contain a portion of the free fatty acids. The so-called "technical oils" which result from a second and third pressing of the seeds also contain free fatty acids, but the greater portion thereof remains behind in the cakes.

In the case of "extracted oils," as opposed to oils obtained by pressing, it is pointed out that the composition of the fat extracted is the same as that left behind in the seeds (i.e., both contain the same percentage of free acids), since both glycerides and fats are equally dissolved by the solvents. The test for free acids, together with a microscopical examination, serves therefore to distinguish "extracted" from "pressed" meal; and further, by testing the oils also for free acid "extracted" and "pressed" oils can be distinguished. This holds as long as the product is unadulterated. A number of analyses of palm-nut cake and of cocoa-nut cake are given which bear out this point.—*Oil, Paint, and Drug Reporter (Zeits. Anal. Chemie.)*.

ANALYSTS AT VARIANCE.

AN extraordinary conflict of opinion between analysts occurred at the Portsmouth Police Court a few days since, in connection with an information against a grocer of that town for selling adulterated butter. Three separate certificates were handed in. The first, which was from the Borough Analyst (Dr. B. H. Mumby), showed that the article sold consisted entirely of margarine; the second, signed by the County Analyst (Dr. Angell), to whom the defendant forwarded a sample after breaking the seal, was to the effect that the butter was quite pure, though not of the highest quality; and the third, signed by three of the official analysts at Somerset House, showed that of 85 per cent. of fat in the butter, 15 per cent. only was foreign fat. Mr. Matthews, barrister-at-law, who defended, claimed an acquittal, on the ground that the various analyses were in complete conflict. The magistrates, however, declined to give full weight to Dr. Angell's certificate, on the ground that since the seal had been broken, there was nothing to show that the sample forwarded to Dr. Angell was the same as that left with the defendant by the sanitary officer. They convicted on the Somerset House certificate, and fined the defendant £1. and costs. At a meeting of the Portsmouth Grocers' Association, on Tuesday evening, attention was called to the extraordinary discrepancy between the certificate of Dr. Mumby and that of the official chemists at Somerset House, and it was resolved to write to the Sanitary Council, requesting that the Borough Analyst should be called upon for an explanation.

PRIZE COMPETITION.

Owing to the number of competitors and the variety of schemes and processes submitted to us, we are compelled to postpone the prize award for two or three weeks, in order to allow us to try all the processes in our own laboratory.

WATER-GAS IN AMERICA.

A GERMAN-AMERICAN gas engineer, writing to the *Journal für Gasbeleuchtung* on the gas industry in America, says most of the gas companies which supply the electric light are losing money in that department. About half the lighting gas now supplied is water-gas. There is no great difference between the cost of water-gas and that of coal-gas; in some cases the balance of pecuniary advantage is the one way, and sometimes the other. The advantages of water-gas are (1) a white, smokeless flame, (2) the process can be interrupted or forced on, which is convenient where the gasholders are small, (3) the apparatus is soon ready for working, (4) fewer hands are required, 10 men as against 25 for 1,750,000 feet per day, and no special call for strength and endurance, which is important in view of strikes. Most works which make coal-gas have now water-gas apparatus ready in case of need. On the other hand (1) unenriched water-gas contains 50 per cent. of carbonic oxide, enriched (through the oxidising action of steam used along with the naphtha) contains, as in New York, only 25 per cent.; still it has introduced a new danger (three cases of death in the first half of February, 1890, in New York alone), and many cases of suicide are due to its now well-known property of ensuring an easy and painless death; formerly gas escapes generally induced unconsciousness and then a racking headache; now they are generally fatal; (2) the tar produced is as thin as ink, has a powerful smell, and is very difficult to get rid of; when thrown away it results in actions for damages; (3) there is more condensation, and that more oily, in the street pipes; (4) this condensation destroys the leather of dry meters and causes an increasingly heavy outlay for repairs. The use of gas for cooking and heating is rapidly extending; but hopes of replacing solid fuel by water-gas or Siemens gas are not being realised; Mr. Westinghouse has used every effort to devise good gaseous fuel, and has abandoned all the forms, returning to coal-gas as the best for fuel; but even coal-gas is not cheap enough for general use as a fuel. Electricity is pushing so hard that the good times, when the gas manager stayed in his office while his customers came to him, are now over; he must now bestir himself like any other man of business or the undertaking goes backwards.

CHROME MORDANTS FOR ALIZARINE COLOURS.

ALTHOUGH the alizarine colours, as they are called, can be dyed or printed on wool, cotton, and silk, with alumina and iron mordants, yet the chrome mordants are by far the best for the purpose. This arises from the fact that chrome mordants on the whole fix these colours better and therefore give faster shades than the other mordants; further, they yield purer shades, do not alter them as much, for instance, as iron mordants do; and they are more generally applicable. The chrome mordants most generally used are the bichromates of potash and soda, chrome alum, and acetate of chrome. Chrome alum is the double sulphate of chromium and potassium, which crystallises with 24 molecules of water of crystallisation in the form of octahedral crystals, and is obtained as a by-product in the manufacture of alizarine. It is well suited for the mordanting of wool, although it is rarely used, which is due to the fact that it takes longer boiling to bring about the mordanting of the wool unless larger quantities of cream of tartar are used with it; this is not admissible on account of the increased expense.

The bichromate of potash is the chrome mordant mostly used in the wool dyeing. The operation of this salt in mordanting is based upon the fact that the chromic acid is reduced to oxide of chromium, and the matter is, as it were, deposited on the wool fibre in a nascent condition, thus bringing about an unusually intimate and firm fixation of the colouring matter. This reduction of the chromic matter takes place when reducible substances, such as organic acids or salts, are added, at the expense of the latter, or if these be not used, or non-reducible or organic acids or salts be added to the mordanting bath, the chromic acid is converted into oxide, but to a less degree, by the reducing action of the fibre itself.

The former method, the addition of reducible organic substances, is preferable, in order to preserve the strength, etc., of the wool fibre. The reducing agents mostly used are tartar (bitartrate of potash), and gallic acid. Sometimes small quantities of organic or inorganic acids

or acid salts are added when the water used contains a large amount of lime; acetic or oxalic acids give the best results in this case; mordanting bath must be slightly acid, and, lime having a neutral effect, these acid additions must be made to correct this action. These mordant assistants (tartar, oxalic acid) are rather expensive substitutes are often offered, but these give very inferior results both as regards thorough exhaustion of the dyebath, and bright solidity of the shades obtained.

When bichromate of potash and organic reducing agents are used the mordanted wool has a green colour, due to the oxide of chromium which is deposited on the fibre; while, if the bichromate be used or with sulphuric acid or inorganic salts, the wool has a yellow colour due to its taking up chromic acid. The former condition is suitable for taking up such dyestuffs as alizarine, and the latter for wool dyeing. As the result of experience the proportions of mordanting agents that give the best results have been found to be 1 per cent. of bichromate of potash and 2½ per cent. of tartar, or 1 per cent. bichromate and 1 per cent. sulphuric acid. The mordant must be about 20 or 30 times the weight of the wool, the smaller proportion is, the slower, and consequently the less perfect will be the precipitation of the chromium oxide on the wool. When quantities of wool are to be mordanted in large vats, it is advisable to increase this proportion. Each ingredient is dissolved separately and added to the bath. The wool is then entered, and the whole rapidly boiling for from 1½ to 2 hours. For very light shades requiring little dyestuff, it is best to diminish the proportions of mordant.—*Kuhlow*.

INDAMINE BLUE.

THIS dyestuff, which is sold in the form of a paste, is the chloride of a base of the induline series. Like other members of the same group, it is used for dyeing shades of blue, resembling indigo on the various fibres. On wool it may be applied either in a neutral or slightly acid bath. It gives very even shades, but the disadvantage of rubbing off. Cotton can be dyed in various ways. The brightest shades are obtained by mordanting with acid, fixing with a salt of antimony, dyeing in a bath of the dyestuff and then immediately, without rinsing, working the dyed material in a bath containing either 15 per cent. of the weight of the cotton of potassium bichromate or 2½ per cent. of potassium bichromate and 10 per cent. of sulphuric acid, at a temperature of 50°–60° for 10 minutes. For dyeing a full shade, the cotton must be mordanted with 10 per cent. of its weight of tannic acid.

Another plan consists in applying the dyestuff on unmordanted cotton in a bath containing sodium acetate; 10–20 per cent. of dyestuff used remains in the dye-bath. The cotton is, without rinsing, chromed with 15 per cent. of its weight of bichromate of potash; better still, with a mixture of 2 per cent. of this salt, and 3½ per cent. of copper sulphate, these being the proportions required for copper chromate. As a certain amount of metallic oxide fixes the cotton, in combination with the insoluble colour formed, the goods are topped with logwood, &c., without further mordanting. It is, however, preferable, when such colouring matters are to be subsequently applied, to increase the quantity of copper chromate in the dye-bath to, say, 6 per cent. of potassium bichromate and 10 per cent. of copper sulphate, and to boil the goods in such a solution for an hour.

For calico printing, the paste only requires mixing with a little water containing a little acetic acid, and steaming, in order to give fast colours, whose fastness is further increased by chroming. The potassium and tartrate of the colour-base give the best results. The actions of an aqueous solution of indamine blue R. are as follows: sodium hydrate precipitates the base of a dark red violet; tannic acid completely precipitates; concentrated sulphuric acid dissolves the dyestuff with a blue colour; stannous chloride produces a slight precipitate; zinc dust and ammonia decolorize.—*Chem.*

ALLSOPPS' SHAREHOLDERS.—A meeting of the shareholders of Allsopp and Sons was held the other day to receive the report of the Committee of Investigation, appointed at a meeting in March. The Chairman of the Committee read the statement which had been presented to them by the accountants. The latter had examined the books, and found that there had been no misrepresentation of the prospectus, but the accounts showed that during the last three years there had been a decrease of 23½ per cent. in the profits. The Committee submitted that the vendors should waive their dividend of ordinary stock until the other holders had received a dividend of 10 per cent. A resolution was proposed calling upon the vendors to refund the sum of half a million, as being the excess of the goods and this was unanimously adopted.

COAL MINING STATISTICS.

rt of Mr. Joseph Dickinson, H.M. Inspector of Mines, Manchester and Ireland district, contains many facts and many matters of interest. It deserves to be better known. Confidential intimations of apprehended danger or actual accident to the inspectors are attended to, whether anonymous. His district only 17 were received in 1889, and in one of them a warning had forgotten to mention the name of the person he desired to call attention. What is more to the purpose, where the complaint was investigated it was well suggested that some plan like that in force in Germany, a representative committee of workmen have periodical meetings with the managers for the purpose of considering all reports of proposals of safeguards, might usefully be adopted also in this country. Every reasonable precaution that can be devised ought to be taken, and the progress that already has been made should be an incentive to further exertion in this direction. When the figures of deaths and fatalities in North and East Lancashire are examined, it is seen that since the passing of the Act of 1850, "the ratio of deaths has diminished nearly one-half, and the deaths more than in proportion to the number of miners employed." Mr. Dickinson mentions that of the 10,265,221 tons of coal wrought in 1889, 4,876 came from a depth of less than 100 yards, 7,910,463 between 100 and 500 yards, and 1,129,882 from between 500 and 1,000 yards. In the Ashton Moss Colliery, the coal is worked to a depth of 1,020 yards vertical depth, and in the Pendleton Colliery at 1,000 yards. Taking the whole of the United Kingdom, there are 10 persons employed in and about mines. The production is as follows: Coal, 176,916,724; fireclay, 2,192,346; iron-ore, 70,542; oil shale, 2,014,860; minor minerals, 239,184; a total of 19,633,656 tons. The fatal accidents in 1889, numbered 912, resulted in the death of 1,128 persons. The importance of our mining industry is not likely to be under-estimated, and it is at once a matter of good policy to safeguard as far as it is humanly practicable the lives of those who are engaged in the arduous task of winning the depths of the earth the raw material on which depends the prosperity of the industry and wealth of the country.

THE GOLD DEPOSITS OF PERU.

Charles Mansfield, the British Minister at Lima, has recently sent to the Foreign Office an elaborate report on the auriferous deposits of Peru, drawn from the report of the Lima School of Mining. The mountain ranges of Peru, in the vicinity of the seaboard, when the rocks are of a crystalline character, gold is found in veins of which have been intruded into the granite and syenite. In this district all the spurs of the Andes are of these formations, and the quartz is almost invariably accompanied by oxide of iron and the proportion of oxide of iron varies considerably. Every form is met with, from white quartz, permeated with small brown spots, to a reddish rock so charged with oxide of iron that it is almost the whole of the auriferous mineral, the quartz being, as it were, in an accidental manner. The quartz in the mountains is the minerals of the coast varies considerably in appearance, being crystallized in prisms, in semi-crystallized grains, agglomerated and united by oxide of iron, or in amorphous masses more or less friable, with the appearance of scoria. In this district the quartz is often associated with other minerals, such as a white substance, smooth to the touch, with a silky, almost silvery lustre, with flakes of carbonate of lime of a laminar structure, and of a resinous appearance. Lastly, on the coast of Peru gold is sometimes discerned in copper minerals, as well as in those with chalk, copper pyrites, malachite, alacmite, and silicate of iron.

In the upland districts, where the formations exhibit the character of aqueous deposits, veins of gold are not only found in the earths, but also in metamorphic rocks, such as quartzites and schists, intruding themselves into the sedimentary and eruptive rocks. In these veins the gold is sometimes in a pure state, as in pyrites, sulphuret of iron, or accompanied by other metallic substances more or less auriferous, copper pyrites, panabase, bournonite, jamesonite, &c. Gold in the mountain range is found in veins and in the alluvial districts of the same in flakes and nuggets. In the Cordillera Oriental, in the district called the Montana, usually found in quartz veins injected into talc and clay slate by the crystalline rocks. The quartz which accompanies the gold in this district is white, and occasionally exhibits marks of oxide of iron; the latter is never found in the same abundance as in the mountains and minerals of the seaboard. In this part of Peru there are no beds of auriferous soil, and it is from here that the greater number of nuggets have been extracted. The report then passes in

review all the districts of the country where, as far as is known at present, the existence of gold has been authenticated, following the departments in geographical succession from north to south. The information is given in great detail, and refers to all the mines, worked and unworked, and gold deposits known to exist in Peru, with details respecting the quantity of the metal obtainable. This portion of the report occupies 26 pages.

MIXTURES FOR CLEANING THE HANDS.

IN chemical works, it is not an uncommon occurrence for one's hands to become so soiled with the various well defined and separate nastinesses to be found there, as to be quite insusceptible of cleansing by ordinary soaps or soap powders. One or two chemists of our acquaintance use a mixture under these circumstances, which we publish for the benefit of those of our readers who care to try it. Take about two or three grammes of bleaching powder, the same quantity of soda ash, and about twice their bulk of sawdust. Completely saturate these with caustic soda liquor, say 10 or 15 Twaddell, and quickly rub over the hands. As soon as the desired effect is produced, rinse the hands with water. It is occasionally necessary to repeat the process, but, as a rule, one application suffices to make the hands perfectly clean. There is an odour of bleaching powder perceptible from hands thus treated, to which some may object, but this may be destroyed, and the appearance of the hands still further improved by rubbing them over with a little sulphurous acid solution, or by rubbing first with a solution of sulphite or hyposulphite of soda, or sulphite of ammonia, and, while still wet from this, rubbing over with very dilute hydrochloric or sulphuric acid. The hands should be well washed with water, and a little ten per cent. glycerine rubbed in to keep them soft.

Nitric acid stains on the hands still appear to defy all comers, except pumice stone, but inks, and organic stains may—in the absence of bleaching powder—be generally removed by a mixture of chlorate of potash, and hydrochloric acid.

AFRICAN INDIGO.

THE production of indigo in West Africa, says the *Deutsche Wollen Gewerbe*, is almost entirely in the charge of women, and its extent depends upon the manufacture of cotton goods by the natives. How important this industry is can be judged from the fact that millions of metres of cotton fabrics are annually manufactured upon the primitive hand-loom of the country for the domestic consumption and for export. Especially extensive is the export of these goods to Brazil, where they have become very fashionable, and are particularly used for decorative purposes. The most popular colour for these fabrics is the blue derived from indigo. A commission which, in 1886, was sent by the Government from Lagos to Yoruba, to report on the culture of indigo, stated that in the city of Ibadan, with a population of about 150,000, nearly everybody is clothed in blue stuffs. Upon the banks of the Gambia River this industry is carried on very extensively. The indigo is there known under various names, as "Carro" in Mandingo, "N'Gangha" in Volof, "Elu" in Yoruba, "Suini" or "Luni" in Houssa, while the plant is called "Baba." In the valley of the Niger River the pure precipitate is produced, in which form alone the indigo has a market value. In Gambia and Yoruba it is found in the form of balls of rotten leaves; mostly mixed with cowdung, and without commercial value outside the country. The process of extracting the indigo is as follows:—In an earthen vessel of about 60 quarts capacity the leaves are steeped, and thereby an extract produced which is fermented; then the liquid is poured off and exposed to the action of the air. When the precipitation takes place, and all the dyestuff has settled to the bottom of the vessel, the supernatant liquor is poured off, the pulverulent precipitate mixed with a little gum, and formed into small balls, &c. The materials to be dyed are steeped in the extract before exposing it to the air, and dried in the open air, which operation is repeated until the desired shade is obtained. For the production of stripes or of patterns in different shades of colour, the material is sewed together where a lighter shade is desired, whereby the intensity of the blue is diminished.

STRIKE OF ST. HELENS GLASS WORKERS.—At one o'clock, on Saturday, the casting hall men at Messrs. Pilkington's top works, St. Helens, who are agitating for an advance of wages, left work in accordance with their resolution. In other departments, such as grinding, smoothing, and polishing, the machinery is stopped, and about 1,500 hands will be thrown idle.

THE NEW FERTILISER LAW.

THE following act relating to the fertiliser trade in the State of New York, passed the Legislature of this State at its recent session, and in order to give information to all interested in the business, the New York Fertiliser and Chemical Exchange decided to publish a copy of the bill for gratuitous circulation.

SECTION 1. All commercial fertilisers which shall be offered for sale, to be used in this state, shall be accompanied by an analysis stating the per centages contained therein of nitrogen or its equivalent of ammonia, of soluble and available phosphoric acid, the available phosphoric acid either to be soluble in water or in a neutral solution of citrate of ammonia, as determined by the methods agreed upon by the American Society of Agricultural Chemists, and of potash soluble in distilled water. A legible statement of the analysis of the goods shall be printed on, or attached to each package of fertilisers offered for sale for use in this state; and where fertilisers are sold in bulk, to be used in this state, an analysis shall accompany the same, with an affidavit that it is a true representation of the contents of article or articles.

SEC. 2. Manufacturers residing in this state and agents or sellers of fertilisers made by persons residing outside the limits of this state, shall, between the first and twentieth days of July in each year, furnish to the Director of the New York State Agricultural Experiment Station at Geneva a list of the commercial fertilisers they manufacture or offer for sale for use in this state, with the names or brands by which they are known on the market, and the several per centages of nitrogen or its equivalent of ammonia, of phosphoric acid soluble and available, and of potash, either single or combined, contained in said fertiliser, as called for in section one of this act. Whenever any fertiliser, or fertilising ingredients, are shipped or sold in bulk for use by farmers in this state, a statement must be sent to the Director of the New York State Agricultural Experiment Station, at Geneva, giving the name of the goods so shipped, and accompanied with an affidavit from the seller, giving the analysis of such per centage guaranteed.

SEC. 3. Whenever a correct chemical analysis of any fertiliser offered for sale in this state shall show a deficiency of not more than one-third of one per cent. of nitrogen or its equivalent of phosphoric acid, or one-half of one per cent. of ammonia soluble or available, and one-half of one per cent. of potash soluble in distilled water, such statements shall not be deemed false within the meaning of this act. This act shall apply to all articles of fertilisers offered or exposed for sale for use in the State of New York, the selling price of which is ten dollars per ton or higher, and of which they are part or parcel, and of any element into which they enter as fertilising material, among which may be enumerated nitrate of soda, sulphate of ammonia, dissolved bone black and bone black undissolved, any phosphate rock, treated or untreated with sulphuric or other acids, ashes from whatever source obtained, potash salts of all kinds, fish scrap, dried or undried, also all combinations of phosphoric acid, nitrogen or potash, from whatever source obtained, as well as all and every article that is or may be combined for fertilising purposes.

SEC. 4. All manufacturers or dealers exposing or offering for sale in this state fertilisers containing roasted leather or any other form of inert nitrogenous matter, shall, in legible print, state the fact on the packages in which the fertilisers are offered or exposed for sale.

SEC. 5. Every person, firm, or corporation violating any of the provisions of this act shall, upon conviction thereof, for the first offence be punished by a fine not less than 50 dollars and not more than 200 dollars, and for the second offence by double the amount in the discretion of the court; such fines to be paid to the officer whose duty it is to enforce the provisions of this act, to be used by him for that purpose, and to be accounted for to the comptroller.

SEC. 6. The Director of the New York State Agricultural Experiment Station at Geneva is charged with the enforcement of the provisions of this act, and shall prosecute in the name of the people, for violations thereof; and for that purpose he may employ agents, counsel, chemists, and experts, and the Court of Special Sessions shall have concurrent jurisdiction to hear and determine charges for violating the provisions of this act committed in their respective counties, subject to the power of removal provided in chapter one of title six, of the code of criminal procedure.

SEC. 7. And the said Director of the New York State Agricultural Experiment Station at Geneva, or his duly authorised agents, shall have full access, egress and ingress to all places of business, factories, buildings, cars, vessels, or other places where any manufactured fertiliser is sold, offered for sale, or manufactured. Such Director shall also have power to open any package, barrel, or other thing containing manufactured fertiliser, and may take therefrom sufficient samples; and whenever any such fertiliser is so taken for samples, it may be

divided into different portions, and one or more portions sealed in a way that it cannot be opened without upon examination evidence of having been opened to the person sealing the same delivered to the person from whom said sample is taken, or any person that may be agreed upon, by the said director or his agent takes the same, and the person from whom it is taken, which portion delivered may, upon consent of the parties, be delivered to a chemist for the purpose of being analysed other than the chemist employed by said Director.

SEC. 8. The sum of 20,000 dollars, or so much thereof as is necessary, is hereby appropriated out of any money in the treasury otherwise appropriated, to be used by said Director of the New York State Agricultural Experiment Station at Geneva, as shall be authorized by the board of control thereof, in enforcing the provisions of this act. Said sum shall be paid to said Director by the treasurer upon warrant of the Comptroller, upon vouchers to be approved by the Comptroller, in such sums and at such times as said Director require, who shall file a statement for what purposes he desires same.

SEC. 9. Agents, representatives, or sellers of manufactured fertiliser or fertilising material made or owned by parties outside of this state and offered for sale for use in this State, shall conform to the provisions of this Act, and shall be subject to its penalties, and in all parts shall take the place of their non-resident principal.

SEC. 10. Chapter 222 of the laws of 1878 is hereby repealed.

SEC. 11. This act shall take effect immediately.

—Oil Paint and Drug Reporter

THE IMPENDING FALL IN COAL PRICE

THERE are already indications that coal prices are giving in several distinct parts of the kingdom; and, therefore, gas companies that have held out against the combination of owners and the inflated state of the market, will, in all probability soon have the advantage of such of their competitors as have made tracts at top prices. Of course, a desperate struggle will be made a few weeks to check the inevitable tumble, or, at least, to postpone it until most of the large gas coal purchases for the year have been concluded; but such efforts must be futile. The reason for this condition lies on the surface. It is universally admitted that the iron market has gone to pieces. After a phenomenal gamble, the reaction has set in; and iron manufacturers are now accumulating stocks at an extremely uncomfortable rate for themselves. The price of iron has gone down to one-half the highest rate of the past winter, and probably fall lower. In these circumstances, how is the value of coal to be maintained? If the great coal and iron companies cannot make and selling iron, they must part with their coal; and matter of fact, several sellers who a week or so ago were most extolled over the prospect of having a good turn at last, are approaching buyers and offering supplies at a marked reduction. They can help themselves. In a normal condition of trade, at least 40 per cent of the gross coal output of the country goes in the iron manufacture. When the iron trade is very brisk, as it has lately been, a ser additional quantity of coal is drafted into the iron-works, which is scarce elsewhere. The slightest check in the demand for iron of its merchantable forms is quickly felt in a reduced demand for fuel; and so the wheels go round. No combination among owners, who are so often iron-masters also, can hold good for after the market turns against them. They will talk very big of their rights, and their determination to enforce them; but this confidence only lasts while the market is rising, and when any combination that can hold together for a week or two must make matters better for them. So soon as things begin to appear queer, each looks out for evidence of the other giving way; and so, at the first disquieting rumour, the portentous combination dissolves into a swarm of mutually destructive individuals. When the coal owners touch bottom, nobody will pity them. Some, who have managed to secure contracts while the "boom" has lasted, will not look for commiseration. What has specially enraged purchasers of coal during the few months is the unreasonableness of the advances asked and insisted upon in some deplorable instances. A moderate increase of price we have all along contended, would have been paid without grumbling; but the coal owners want to recoup all their past losses in one stroke, and have over-reached themselves in the attempt. If gas companies had not hurried forward their contracts, the playing into the hands of the coal-owners, the downward move would have set in earlier; but it will now in all probability be general and irresistible, if not rapid.—*Journal of Gas Lighting.*

Correspondence.

not hold ourselves responsible for the opinions expressed by our correspondents.

SULPHIATES IN NITRIC ACID.

To the Editor of the Chemical Trade Journal.

In your issue of the 21st inst., under *Selected Correspondence*, I interest a letter by Mr. J. H. Huxley from the *Chemical News*, at he had been recently a good deal perplexed by finding "acid" (sic) in steel and pig iron, in which he knew it was to be present; further, that he found the nitric acid S.g. 1.42 "a considerable per centage of sulphuric acid," and, further, the makers assert that the sulphuric acid is derived from sh glass Winchesters in which it was supplied. Question affects a large section of your readers, viz.: Manufacture of pure nitric acid, and works' chemists, besides analysts of imitations. I have therefore written to you as being a trade wide circulation to give you my own experience. For five more I had to make daily analyses of steel of the greatest purity, especially as regards sulphur (not sulphuric acid), this it was necessary to be absolutely certain that the acids of the highest attainable purity. I have purchased for myself of green glass Winchesters filled with nitric acid S.g. 1.42 from a well-known provincial firm, and I have never found a quantity of acid impurity in the nitric acid which, on the quantity capable of influencing by .001 % the per centage of sulphuric acid. I am one of those heretics who believe that .0001 % is worth arguing; and in nearly every case I have found the nitric acid free from H_2SO_4 after most careful testing of samples most cases had been three months in bottle in my own laboratory by no means infrequent to find chemists complaining of the which are supplied to them by dealers, and it is to be regretted any cases the complaint is justified by the facts. Now, sir, in it would perhaps be not too much to ask whether sufficient been taken to be sure that this "considerable per centage" of sulphuric acid was considerable enough to vitiate the results for a first-class steel. In other words, we of the trade would require definite statement as to the facts, particularly as to the amount of H_2SO_4 by $BaSO_4$, the amount of dilution, and the test. I have controlled the manufacture of considerable quantities of nitric acid, and I am sure I should have been very pleased to receive a definite complaint against my product. But I think that if I had that H_2SO_4 in my acid was accounted for to any appreciable extent, the greenness of the bottles, I should have done so under a reservation involving a greenness of a totally different kind. I am, F. I. C.

Trade Notes.

LEGAL PATENT CASE.—In the Chancery division, on Monday, Mr. Justice Kekewich, the case of *Rawes v. Chance Brothers*, for hearing. With Sir Richard Webster, Q.C., M.P., there for the plaintiffs Mr. Theodore Aston, Q.C., and Mr. Moulton, Q.C., M.P., with whom were Mr. Lawson and Mr. and for the defendants, Sir Horace Davey, Q.C., M.P., and Mr. Moulton, Q.C., M.P., with whom was Mr. Carpmal. There was a considerable array of chemical experts. As the case was proceeding it went to press, we withhold a fuller report.

ARE FRENCH WINES MADE OF?—Last year France produced 3,000,000 hectolitres of wine, and herself consumed 45,000,000 litres, to say nothing of the exportation. How, then, was the "wine" produced? Clearly it was artificially produced. But how? From Levantine raisins, some say. But the statistics show that less than two million hectolitres were made from dried grapes. It may, therefore, not unfairly be said that the fifty or sixty million hectolitres which remain to be made are made from even more illegitimate materials. It is said that good French wine is not to be obtained in France. The juice of the grape is sent abroad, while the juice of other things is sent home, for aught we know—is sold to the Frenchman, who himself upon recognising a good glass of wine when he tastes it, says the Channel this matter of dried grapes has become quite common.

M. Tirard's Cabinet went out on it three months ago, and the Government is proposing to adopt a little more protection for wine made from foreign grapes with a duty of three francs per hectolitre.

MIXING OF AMERICAN AND RUSSIAN OILS.—*Bradstreet's* gives a statement of a Philadelphia journal to the effect that 10,000,000 gallons of crude petroleum have been purchased for export to be mixed with Russian oil, furnishing "a startling instance of a practice that has been in vogue in Europe for a long time, to the great injury of the American oil export trade." Austrian refiners have been buying crude American oil, mixing it with the much inferior petroleum from the Russian wells, and selling the mixture as genuine American kerosene. It is added that "under American brands this bogus oil has been sold in the foreign markets wherever American oil is in demand, and the inferior quality of the spurious kerosene has given a bad name to all oils bearing American brands."

THE ROYAL SCHOOL OF MINES.—An important regulation has been decided upon, affecting students at the Normal School of Science and Royal School of Mines. As a result, no student will, after the session 1890-91, be entered for the associateship course, except under very special circumstances, unless he has passed in the first class of the elementary stage of mathematics, chemistry, and physics, and can show to the satisfaction of the Council that he possesses the necessary elementary knowledge of those subjects. The Council has been compelled to take this step by the fact that without some preliminary knowledge of mathematics, chemistry, and physics it is impossible for students to follow the course with advantage.

INDIA-RUBBER BALLS.—It is reported that the annual production of india-rubber toy balls in different countries—in dozens—is: Germany, 2,850,000; France, 800,000; Russia, 750,000; England, 630,000; Austria, 520,000; America, 500,000; Italy, 450,000; total, say, 6,500,000 dozen. The demand on the German manufacturers is increasing yearly. Germany alone exports to England about 850,000 dozen; to America about 900,000 dozen; keeping for home trade about 550,000 dozen; and sending the balance to Holland, France, Spain, Portugal, Norway, Sweden, and the Australian Colonies. The "Presents from Southport" and "Presents from Blackpool" balls will all be found to have inscribed on one side, "manufactured in Germany."

EFFECT OF THE MCKINLEY TARIFF BILL.—*Kuhlow's* states that the most careful estimate furnished by a leading firm importing seal plushes, who have taken the trouble to determine the exact effect of the tariff on fine standard qualities of their lines, first-choice goods, is as follows:—

No.	24" 1	24" 2	50" 3	50" 4	50" 5
Whether silk or cotton predominant.	Cotton.	Cotton.	Cotton.	Silk.	Silk.
Present Price,	\$1.30	\$1.85	\$4.50	\$5.50	\$7.50
Proposed Additional Duty	.49	.52	1.29	3.60	4.59
McKinley prices,	\$1.79	\$2.37	\$5.79	\$9.10	\$12.09

and when it is remembered that the present duty is 50%, it will be seen how largely the duty is to be increased. Besides this, an additional 5% is levied by the Customs Administrative Bill, which puts a duty on packages. This shows, pretty clearly, brother Jonathan's ideas on the subject of protection.

THE DECIMAL SYSTEM.—The Vice-President of the Council (Sir W. Hart Dyke) last week received a deputation at the Education Department from the Associated Chambers of Commerce, which urged that the study of the decimal system of coinage, weights, and measures should be made a compulsory subject in all elementary schools. The deputation consisted of Colonel Hill, M.P. (President of the Associated Chambers), Sir Henry Roscoe, M.P., Mr. S. Montagu, M.P., Mr. Thomas Shaw, M.P., Sir Philip Magnus, Sir V. K. Barrington, Colonel Robson, Mr. James Hole, Mr. E. W. Fithian, Mr. J. D. Leader, Major Hughes, and others. The Vice-President, in reply, said that personally he had long been in favour of the adoption of a decimal currency by this country, as he believed the gain, commercial and otherwise, would be enormous. He cordially sympathized with the deputation, but so vast and considerable a change could only be adopted probably after a long discussion and debate in Parliament, and on the responsibility and suggestion of the Government. The duty of the Department was to secure the best elementary education they could for the large mass of the children, and they thought they were performing their duty by training every child in the elementary schools in such a manner that he might immediately take advantage of that training when he went forth into life. The difficult question, therefore, arose, whether until this system had been adopted in this country they were justified in carrying out to the full the suggestions made by the deputation. If he could in any degree forward the objects they supported he should be glad, but the Department must have in view that it was their duty to give not only the best education, but the one immediately suitable to the welfare, progress, and success in life of the children.

MINERAL INDIA RUBBER ASPHALTE.—Another article formerly considered worthless has been added to the useful products, and is known and is called mineral indiarubber asphalte. It is produced during the process of refining tar by sulphuric acid, and forms a black material very much like ordinary asphalte, and elastic like india-rubber. When heated so that the slimy matter is reduced to about 60 per cent. of its former size, a substance is produced hard like ebony. It can be dissolved in naphtha, and is an excellent non-conductor of electricity, and therefore valuable for covering telegraph wires and other purposes where a non-conducting substance is needed. Dissolved, the mineral indiarubber produces a good waterproof varnish. The manufacture of the material is very profitable, and pays the inventor 400 or 500 per cent.—*Kuhlowl.*

THE MINERAL WEALTH OF NEWFOUNDLAND.—In their June circular Messrs. Seward and Co., of 7, Draper's-gardens, London, E.C., point out that the recent political dissatisfaction in Newfoundland instead of doing harm ought to have the effect of directing attention to the island and to its mineral wealth and capabilities. Undoubtedly, there is copper in abundance, and now that the price of this metal has so considerably advanced money should be readily forthcoming to develop the country. The Cape Copper Company are leading the way, and have made arrangements to take over and work the Tilt Cove Mine. Copper has been found in many of the Newfoundland Colonisation and Mining Company's Grants. The manager is at present directing his efforts chiefly to developing the La Manche Lead Mine, which is opening out satisfactorily, and it is probable that before long the Colonisation and Mining Company will be able to profitably dispose of the mine. The completion of the railway system in the island will at once put considerable value on the 100 square miles of land held by the Colonisation and Mining Company.

THE COLOUR OF WATER.—Like the gases oxygen and hydrogen, of which it is composed, pure water has no taste or smell, and, like air, it appears to be colourless when in thin layers; but when looked at in large masses, as in the sea, and in deep lakes, it is blue. Pure water, especially sea water for example, is limpid, clear, and transparent. It absorbs all the prismatic colours, except that of ultramarine, which being reflected in every direction, imparts a hue approaching the azure of the sky. The true tint of water when not exposed to atmospheric influence is always uniform, but it changes its colour in certain localities from the presence of infusoria, vegetable substances, and minute particles of matter. Water, in a natural state, is said to be never wholly pure. Drawn from a shallow well, it may look bright and sparkling, and yet be full of deadly poison for the animal and human system. Speaking generally, pure water has the bluish hue, yet some has a strong brown or yellowish tint from peat or iron, and yet is free from impurity. The water of Loch Katrine, which supplies Glasgow, is thus coloured, and some of the purest from artesian wells. The blue tint of water may be discerned in the following manner:—Let down into water a metal tube (open at the top and closed with a clean glass plate at the bottom) near to a white object 20 feet below the surface. The object when looked at through the tube has a most beautiful blue colour. It would have appeared to be yellow, if its colour was due to the light reflected by extremely small particles of matter suspended in the water.

THE ST. HELENS CHEMICAL WORKERS' ASSOCIATION.—A well-attended meeting of the members of this association was held last week in the coach house, Cotham-street. Mr. P. J. King addressed the meeting at some length, he said that some weeks ago he told them they were organising a campaign against the cowards, blacklegs, and knob-sticks. The Union in St. Helens was now strong enough to assert itself, and he hoped that during the election of the various yard committees that was to take place, anyone connected with the previous committee who was afraid to assert himself, was ashamed of his connection with the Union, and frightened to speak to the managers or foremen, would be relegated into private life. They did not want irrational, imprudent, or hot-headed men, or fiery enthusiasts connected with the committee. They wanted reasonable, rational men who would look at everything put before them from a business standpoint, and deal with it accordingly. He reminded his hearers that he had now got an office at 32, Claughton-street. It was only a temporary one, and he hoped in a short time to get a more imposing structure, where the chemical workers could meet and discuss their grievances. It would be open from 9 to 11 in the forenoon and from 5 to 7 in the afternoon, and during those hours they would find someone who would take down their grievances. If they thought there was anything wrong at the works, they ought to come there and tell him, and he would not be slow to take action. He particularly wished to ask them, if any accident occurred either night or day, to let him know about it and he would get up and go to the spot, to be able to give evidence when the case came before the judge. If they refused him admission to the works it would not tell very favourably; it would show there was something wrong. He instructed them as to several of the rules, and then said he wanted to give a finishing touch to the organisation that month, and if

they would help him he would undertake that in the next month would not be a man, connected with a chemical works in St. Helens who would be outside the Union.

CAST STEEL.—Mr. B. H. Thwaite writes to the *Engineer* follows:—"There is as great a relative difference between crucible cast steel and Bessemer cast steel as there is between varying brands of pig iron. Crucible or pot steel, as generally understood, is refactured from raw materials of a refined character, which from first to last is steel—the process merely converts the integral parts into whole—removes the slag and converts the oxide of the scale of integral parts of the charge. The metal thus undergoes a full process of purification, and its structural uniformity is also increased, think that a simple way of defining the respective qualities of castings produced from (1) blister steel bars by the pot or crucible process, (2) by the Martin process is an open-hearth furnace, (3) by pneumatic or Bessemer process in a converter, may be found by adopting a technical brand nomenclature as follows:—(1) Cast steel brand, P B brand mark; (2) ditto ditto, open-hearth brand, O brand mark; (3) Bessemer or converter brand, C B or B B brand mark. If annealed the letter A may be added. The excellent quality of the steel will be found to be in the order given, and cost of production will be in inverse ratio. If makers of the P B O H B quality of steel castings would adopt it, this system of defining would soon be universally accepted."

THE CONDITION OF THE RIVER MERSEY.—At the fortnightly meeting of the Altrincham Union Rural Sanitary Authority, held at Knutsford on Wednesday, Dr. Fox, medical officer for Mid-Cheshire, reported on a death from typhoid fever which had occurred in the township of Partington under peculiar circumstances. He said that one they must regard most seriously. A man, 21 years of age, a bread-winner, the support of his mother, was carried off by a venereal disease. The cottages in one of which the young man abode upon the river Mersey, which here, as elsewhere, has no appearance than that of an open sewer. After a long investigation the conclusion he had arrived at was that the putrid emanations from the river, and especially from the banks left exposed when the water was low, were the cause of the fever in this particular case. A young man came down a stranger from the county of Kent to live the very brink of this sewage-laden stream. He only worked on the Ship Canal a fortnight, which was the usual period of incubation of typhoid fever, after which time he took to his bed, and in a fortnight the disease had ended fatally. Would it be possible, he regarded the vast interests of local industries, to bring the river to a state of decency? If so, by what body or combination of bodies should the gigantic task be undertaken? He had thought it right to draw attention to this exceptional death from typhoid fever as showing the injurious influence upon a stranger of an atmosphere following the course of the river, laden with every kind of abominable odour which those who had been born and bred in the neighbourhood seemed to be insensible and indifferent, possessing the immunity which was often associated with acclimatisation.—The Guardian the township confirmed the Medical Officer's report, but no resolution was come to on the subject.

Market Reports.

TAR AND AMMONIA PRODUCTS.

There is little change in these; the prices for benzol may be taken as unchanged, 3s. 9d. for 90s. and 2s. 9d. for 50/90s. Anthracene still stationary at last week's prices: 1s. 5d. per unit for 30% A. f. London; carbolic acid crystals without change, current quota being 7½d. to 7¾d. per lb. for 34/35° and 8½d. to 9d. for 40°.

Sulphate of ammonia: Hull price at the beginning of the week to £11, but a recovery has taken place, and prices may be taken at £11. 2s. 6d. Leith is quoted as £11. 1s. 3d., some sellers at £11. 2s. 6d., but purchasers are not forthcoming. The Beckton is still reported £11. 5s. 0d., but no business is reported. A tendency to improvement in the state of the market is anticipated.

REPORT ON MANURE MATERIAL.

Market very quiet, and not much doing. Mineral phosphates rather firmer, the Florida not coming into the market so largely as expected, and there being a large falling off in the production of Somme, prices without material change.

Nothing to report in bone cargoes. A small parcel of bone rather inferior, sold at £5. 5s. per ton ex quay. Nitrate calcium quiet, nothing doing.

The position of other articles unchanged.

MISCELLANEOUS CHEMICAL MARKET.

business continues to be done in caustic soda both for prompt deliveries, and prices are firmer all round. Current quotations:—For 77%, £9 10s. to £9 15s., f.o.b. Tyne; 74%, £9. 15s.; and 60% £7. 15s., all f.o.b. Liverpool. Soda ash ½d. to 1½d. per degree at works. Soda Crystals, £2. 17s. 6d. ton. Chlorate of potash, dull and small sales at 4½d. per lb. powder is more firmly held for forward deliveries, transactions delivery are recorded from £4. 12s. 6d. to £4. 15s. per ton, at works during past week, but for future deliveries makers poised to book under £5. per ton, and more has been obtained. Movement on foot to establish the union of Leblanc soda works, is to advance values of the product for forward deliveries, makers being indisposed to commit themselves to contracts. Vitriol 26s. to 28s. for brown, and £3. for rectified at works. Copper easier on the spot at £22 to £22. 10s. per ton, and for December £21. Acetates of lime without change. Acetates of lead firm at current rates. Brown sugar of lead £18s. 10s. Nitrate of lead still quiet and a little business being done at ton. Potash, caustic and carbonate, in good demand and prices firm.

THE METAL MARKETS.

LONDON.

IRON market has a firmer tone, and although the end of the year is usually a dull time, prices of warrants have improved, and a little more doing in manufactured.

STEEL.—Chili and G.M.B. bars continue firm, and closed £59. 10s. and £59. 15s. three months. Sulphate of copper is flat, and of spot £21. per ton.

Foreign is steady and dearer at £95. 10s. cash, with a slight tendency. English ingots, £99.

PLATES firm, with a better demand all round, though prices at show only a slight advance.

is firm, and other metals steady.

Copper shares Rio Tinto rose ¾ to 23 and eleven-sixteenths, and Barry five-sixteenths to 8 and nine-sixteenths, and Cape Diago one-sixteenth each to 4½ and 3 and one-sixteenth. Rio Tinto one time touched 24½, but this led to sales being made for account.

GLASGOW.

market strong, with a fair business. Scotch done at 44s. 10d. 1½d. cash, also at 44s. 11d. to 45s. 3d. one month, closing 45s. 1d., cash sellers ask ½d. more. Middlesbrough done at 41s. 10½d. cash, also at 41s. 10½d. to 42s. 0½d. one closing buyers at 41s. 11d. cash, sellers ask 42s. Hematite 51s. to 51s. 1½d. cash, also at 51s. 0½d. to 51s. 2½d. one closing buyers 51s. 1½d. cash, sellers at 51s. 2d.

WOLVERHAMPTON.

somewhat more cheerful tone was noticeable to-day, 'Change favourably influenced by better reports from Glasgow, Middlesbrough, and Barrow. Marked bars are in good request at £9. 10s., plates and angles also moved more freely. Common bars 17s. 6d. Sheets weak and irregular. Tredegar tin ar delivered in Staffordshire were quoted £5. 15s. Derbyshire rge pig is selling at 42s. 3d., delivered at Staffordshire works. ar hematite pig delivered in Staffordshire was quoted 65s. for and 55s. for No. 4.

WEST OF SCOTLAND CHEMICALS.

GLASGOW, Tuesday.

ers have been sending out in increased quantity, but there is no movement to report in current values, except in the case of caustic soda, which is again firmer, and fetching better prices all round. The local soda crystals is pretty well taken up for the time being, and it is on report that some makers have had to buy in the southern in order to meet past made engagements, maturing at the time in excess of production. Glasgow price on rails is £2. 15s. 6d. 1%. Bleaching powder has descended a further notch, and is at its lowest point over a period of years. Saltcake is about two shillings and sulphate of copper continues gradually on the slide, being now at £22. or less. The three Scotch makers of bichromate of soda and bichromate of soda concur in describing the present stream of orders as very slack, with much too wide a margin between supply and demand. Prices of both as formerly under articles of agreement. The position of sulphate of soda has improved slightly, perhaps, but still leaves a lot of space for recovery. It was done towards close of week at £11.,

but there have been symptoms of a rally, and quotation is now £11. 1s. 3d., to £11. 2s. 6d., Leith, as under. Chief prices current are:—Soda crystals, 51s. net, Tyne; alum in lump £5., less 2½% Glasgow; borax, English refined, £29. 10s., and boracic acid, £37. 10s. net Glasgow; soda ash, 1½d. less 4%, Tyne; caustic soda, white, 76°, £9. 15s., 70/72°, £8. 13s. 9d., 60/62°, £7. 12s. 6d., and cream, 60/62°, £7. 5s., all less 2½% Liverpool; bicarbonate of soda, 5 cwt. casks, £5. 15s., and 1 cwt. casks, £6. net Tyne; refined alkali, 48/52°, 1½d., less 1½%, Tyne; saltcake, 26s. to 28s.; bleaching powder, £4. 10s. to £4. 12s. 6d., less 5% f.o.r. Glasgow; bichromate of potash, 4d., and of soda, 3d., less 5 and 6% to Scotch and English buyers respectively; chlorate of potash, 4½d., less 5% any port; nitrate of soda 8s. 1½d. to 8s. 3d.; sulphate of ammonia, spot, £11. 1s. 3d. to £11. 2s. 6d., f.o.b. Leith; sal ammoniac, 1st and 2nd white, £37. and £35., less 2½% any port; sulphate of copper, £22., less 5% Liverpool; paraffin scale, hard and soft, 2¾d. per lb.; paraffin wax, 120°, semi-refined, 3¼d.; paraffin spirit (naphtha), 7d. a gallon; paraffin oil (burning), 6¾d., to 7d. on rails Glasgow to all Scotch buyers (English orders negotiable about 1¼d. a gallon lower); ditto (lubricating), 86s., £5. 10s. to £6. per ton; 88s., £6. 10s.; and 890/895°, £7. 15s. to £8. Week's import of sugar at Greenock were 33,350 bags.

THE TYNE CHEMICAL REPORT.

TUESDAY.

Chemicals during the last few days have undergone a decided improvement in this market. Bleaching powder, which last week was neglected and in a weak state, made a further drop in price of half-a-crown a ton, but has now recovered and is in good demand at the moment. Makers are now asking from £4. 15s. to £5. per ton, according to brand. Caustic soda is very strong and price has been advanced ten shillings per ton since last report. Soda ash, crystals, and sulphate of soda steady, and practically unchanged in price.

This being the Newcastle race week, most of the chemical workers here have from two to seven days holiday. Manufacturers, as is usual at this time, take advantage of the stoppage to get all necessary repairs done and flues cleaned.

Messrs. Bell Bros., Limited, of the ammonia soda works, Middlesbrough, are now manufacturing bicarbonate of soda, suitable for making carbonic acid gas, and they recommend it to mineral water manufacturers as being much superior to whitening on the following grounds: It largely increases the production of gas, as the same generator will give three times as much gas from bicarbonate as from whitening. The gas produced is absolutely free from impurities. The waste product, instead of being a worthless nuisance like lime mud from whitening, yields a saleable article, viz., glauber salts. It is much cheaper, as a ton of gas from whitening costs £19. 2s. 6d., and from bicarbonate £15. 10s., exclusive of the value of the glauber salts, if they are recovered.

Chemicals to-day are quoted, Bleaching powder, £4. 15s. per ton, in softwood casks; caustic soda, 77%, £9. 10s. per ton; ground and packed in 3-4 cwt. barrels, £12. 10s. per ton; soda ash, 48/52°, 1½d. per degree, less 5%; soda crystals, £2. 10s. 6d. per ton, in casks, gross weight; £2. 10s. 6d. per ton, in 2 cwt. bags. net weight; and £2. 13s. per ton, in 1 cwt. bags, net weight; sulphate of soda, in bulk, 32s. per ton; ground and packed in casks, 42s. per ton; recovered sulphur, £4. 5s. per ton; chlorate of potash, 4½d. per lb.; silicate of soda, 75° Tw., £2. 10s. per ton; 100° Tw., £3. 7s. 6d. per ton; 140° Tw., £4. per ton; hyposulphite of soda, in 1 cwt. kegs, £5. 15s. per ton; in 5-7 cwt. casks, £5. 5s. per ton; pure white sulphate of alumina, £4 10s. per ton; blanc fixe, £7. 10s. per ton; chloride of barium, £8. per ton; nitrate of baryta, crystals, £18. 15s. per ton; ground, £19. 5s. per ton; sulphide of barium, £5. 10s. per ton—all f.o.b. Tyne, or f.o.r. makers' works.

There is a feeling of easiness about the price of small coals for manufacturing purposes, but no appreciable reduction in quotations.

Durham smalls range from 7s. 6d. to 8s. 6d. per ton, and Northumberland steam from 7s. to 7s. 6d. per ton.

THE LIVERPOOL MINERAL MARKET.

Minerals have maintained their firmness, whilst some ores have further increased in value. Manganese arrivals increased, but the largest portion has gone into consumption, and prices are well maintained. Magnesite freely offering, and prices totally in buyers' favour. Raw lump, 26s., raw ground £6. 10s., and calcined ground £10. to £11. Bauxite (Irish Hill Brand) in strong demand, bringing full prices. Lump, 20s.; seconds, 16s.; thirds, 12s.; ground, 35s. Dolomite, 7s. 6d. per ton at the mine. French Chalk: Arrivals well maintained, demand brisk, and prices are unaltered, especially for G.G.B. "Angel White" brand, 95s. to 100s. medium, 105s. to

110s. superfine. Barytes (carbonate) more inquiry; selected crystal lump is scarce at £6.; No. 1 lumps, 90s.; best, 80s.; seconds and good nuts, 70s.; snalls, 50s.; best ground £6.; and selected crystal ground, £8. Sulphate firm, and prices are better; best lump, 35s. 6d.; good medium, 30s.; medium, 25s. 6d. to 27s. 6d.; common, 18s. 6d. to 20s.; ground best white, C.G.B. brand, 65s.; common, 45s.; grey, 32s. 6d. to 40s. Pumicestone in fair request; ground at £10., and specially selected lump, finest quality, £13. Iron ore easier. Bilbao and Santander, 9s. to 10s. 6d. f.o.b.; Irish, 11s. to 12s. 6d.; Cumberland, 10s. to 12s. 6d. Purple ore quiet. Spanish manganiferous ore continues in fair demand. Emery-stone: Best brands inquired for, and bring full prices. No. 1 lump is quoted £5. 10s. to £6., and smalls £5. to £5. 10s. Fullers' earth steady; 45s. to 50s. for best blue and yellow; fine impalpable ground, £7. Scheelite, wolfram, tungstate of soda, and tungsten metal continue in fair demand. Chrome metal, 5s. 6d. per lb. Chrome ore offering more freely, and prices are easier. Antimony oxide, 24s. to 26s. Asbestos is in strong demand, especially rock; prices firmer. Potter's lead ore continues firm; smalls, £14. to £15.; selected lump, £16. to £17. Calamine: Best qualities are scarce—60s. to 80s. Strontia steady; sulphate (celestine) steady, 16s. 6d. to 17s. Carbonate (native), £15. to £16.; powdered (manufactured), £11. to £12. Limespar: English manufactured, old G.B. brand in demand, and brings full prices; 50s. for ground English. Felspar, 40s. to 50s.; fluorspar, 20s. to £6. Bog ore in demand, firm at 22s. to 25s. Plumbago steady; Spanish, £6.; best Ceylon lump at last quotations; Italian and Bohemian, £4. to £12. per ton; founders', £5. to £6.; Blackwell's "Mineraline," £10. French sand, in cargoes, continues scarce on spot—20s. to 22s. 6d. Ferro-manganese and silicon spiegel easier. Chrome iron, unaltered at last quotations. Ground mica, £50. China clay freely offering—common, 18s. 6d.; good medium 22s. 6d. to 25s.; best, 30s. to 35s. (at Runcorn).

THE LIVERPOOL COLOUR MARKET.

COLOURS unaltered. Ochres: Oxfordshire quoted at £10., £12., £14., and £16.; Derbyshire, 50s. to 55s.; Welsh, best, 50s. to 55s.; seconds, 47s. 6d.; and common, 18s.; Irish, Devonshire, 40s. to 45s.; French, J.C., 55s., 45s. to 60s.; M.C., 65s. to 67s. 6d. Umber: Turkish, cargoes to arrive, 40s. to 50s.; Devonshire, 50s. to 55s. White lead, £21. 10s. to £22. Red lead, £18. Oxide of zinc: V.M. No. 1, £25.; V.M. No. 2, £23. Venetian red, £6. 10s. Cobalt: Prepared oxide, 10s. 6d.; black, 9s. 9d.; blue, 6s. 6d. Affres: No. 1, 3s. 6d.; No. 2, 2s. 6d. Terra Alba: Finest white, 60s.; good, 40s. to 50s. Rouge: Best, £24.; ditto for jewellers, 9d. per lb. Drop black, 25s. to 28s. 6d. Oxide of iron, prime quality, £10. to £15. Paris white, 60s. Emerald green, 10d. per lb. Derbyshire red, 60s. Vermillionette, 5d. to 7d. per lb.

Gazette Notices.

Partnerships Dissolved.

T. MADEW, M. HENSHALL, E. GATER, S. OAKES, AND J. HENSHALL, under the style of the Sun Street Brick and Marl Co., Hanley, brick manufacturers.

New Companies.

CHESHIRE SALT CORPORATION, LIMITED.—This company was registered on the 16th inst., with a capital of £250,000., in £5. shares, to acquire, upon terms of an unregistered agreement of 3rd inst. with Thos. Barrow, certain freehold salt properties at Winsford, Cheshire, and upon terms of an unregistered agreement of 9th inst., to acquire the letters patent of Sigismund Pick, for the manufacture of salt, dated April 6, 1887, No. 5,124. The subscribers are:—

H. E. Smith, 26, Park-place, Leyton	1
W. Parker, 10, Rosslyn-hill, Hampstead	1
J. Bostock, 25, Lebert-road, Forest-gate, insurance agent	1
W. Danney, 6, Lexham gardens, W.	1
B. Hill, 22, Parkhurst-hill-road, N.W., solicitor	1
F. Spooner, 83, Rendlesham-road, N.E., insurance agent	1
J. L. Standen, 60, Moray-road, Tollington-park	1

CHEMISTS' SUPPLY, LIMITED.—This company was registered on the 12th inst., with a capital of £10,000., in £5. shares, to trade as chemists, druggists, soap boilers, dyers, oil and colourmen, and to adopt an unregistered agreement between F. G. Trearne and H. E. Sparks. The subscribers are:—

F. G. Trearne, 86 and 88, Leadenhall-street, chemist	1
H. E. Sparks, 6, Shaftesbury-terrace, Harringay, accountant	1
R. M. Sopwith, 6, Hall-street, City-road, druggist	1
J. E. Moxey, Enfield, coal merchant	1
Mrs. Moxey, Enfield	1
Miss F. L. Trearne, Enfield	1
Miss Trearne, Enfield	1

GENERAL PHOSPHATE CORPORATION, LIMITED.—This company was registered on the 13th inst., with a capital of £1,000,000 in £10. shares, 500 being four shares the owners of which are each to apply for 50 ordinary shares of the first £1 and to pay £20. In respect of each founder's share, towards the preliminary expenses After provision has been made for a reserve fund, a preference non-cumulative dividend of £10 per cent. per annum is to be paid on the ordinary shares, one-third of the residue of the net profits to be divided amongst the holders of the four shares, and the other moiety amongst the ordinary shareholders. The object of the company is to acquire lands and mines in Canada, the United States, the Indies, Norway, Spain, France, Belgium, and elsewhere, which may contain, or supposed to contain, phosphates of lime or other phosphates. An agreement of inst., between Knud Sando and H. Mallaby Deeley, provides for payment of preliminary expenses, and the issue of the founders' shares. The subscribers are:—

Founders' Ord Shares.	Shares.
Lord Stalbridge, 12, Upper Brook-street	1
Sir James Whitehead, Bart., Highfield House, Catford-bridge	1
Sir Jacob Wilson, 5, Great George-street, S.W.	1
The Hon. C. P. Parker, Eccleston, Chester, land agent	1
Sir G. S. Baden Powell, 8, St. George's-place, Hyde-park	1
Sampson S. Lloyd, 2, Cornwall-gardens, S.W.	1
H. Wallaby Deeley, B.A., LL.B., Curson-park, Chester	1

THE LIVERPOOL PATENT SOAP COMPANY, LIMITED has been registered with capital of £50,000., divided into 4,940 ordinary (7 per cent. cumulative preference) of £10. each, and 600 deferred shares of £1. each. The company proposes to do on business as soap manufacturers and merchants.

The Patent List.

This list is compiled from Official sources in the Manchester Technical Laboratory, under the immediate supervision of George E. Davis Alfred R. Davis.

APPLICATIONS FOR LETTERS PATENT.

Grinding Machinery.—(Complete Specification). T. Breakell. 8,864. June 9.
Extraction of Gold. J. W. Macfarlane. 8,884. June 9.
Manufacture of Azo Colours. Read Holliday & Sons, Ltd., and T. Holliday. 8,895. June 9.
Treatment of Cotton Dyed with Azo Colours. Read Holliday & Sons, Ltd. and T. Holliday. 8,896. June 9.
Treatment of Sulphurised Ores. J. C. Butterfield. 8,900. June 9.
Treatment of Alkali Waste for the Production of Sulphuretted Hydrogen. R. H. Davidson, and R. H. Davis. 8,901. June 9.
Extraction of Gold from Refractory Ores. F. G. Jordan. 8,908. June 9.
Charging Inclined Gas Retorts. H. Woodall. 8,909. June 9.
The Production of Ferro-ferric and Ferric Oxides. A. Crossley and J. Jones. 8,914. June 9.
Condensation of Nitric Acid and other Distillation Products.—(Complete Specification). O. Guttman. 8,915. June 9.
Extraction of Lead. F. Ellershausen. 8,916. June 9.
Manufacture of Cement. D. Wilson. 8,919. June 9.
Treatment of Iron Residues resulting from reduction of Organic N compounds. T. Peters. 8,922. June 9.
Refrigerating Apparatus.—(Complete Specification). H. J. Allison. 8,923. June 10.
Coating Metallic Surfaces with Alloys. S. O. Cooper-Coles. 8,929. June 10.
Charging and Drawing Gas Retorts. L. S. d'Isoro. 8,930. June 10.
Electro-deposition.—(Complete Specification). G. H. Felt. 8,933. June 10.
Manufacture of Sulphuretted Hydrogen, Sulphide of Ammonium Alkali. J. Leith. 8,942. June 10.
Agglutinants for Coal Blocks. W. P. Thompson. 8,943. June 10.
Furnaces for use in Manufacture of Tin and Terne Plates. J. Ha. 8,954. June 10.
Electro Motors. R. Kennedy. 8,964. June 10.
Prevention of Oxidation of Copper during Annealing.—(Complete Specification). H. H. Lake. 8,989. June 10.
Manufacture of Iron and Steel.—(Complete Specification). H. H. Lake. June 10.
Reduction of Ore.—(Complete Specification). H. W. Lash, and J. Johnson. June 10.
Production of Colouring Matters from Nitroso Compounds. B. Will. 9,001. June 11.
Apparatus for the Manufacture of Aerated Liquids. L. G. Chinnery. S. M. Chinnery. 9,048. June 11.
Electrical Meters. S. Z. de Ferranti and A. Wright. 9,061. June 11.
Separation of Fats from Emulsions. C. D. Heustrom. 9,062. June 11.
Manufacture of Phenolether and Oxydiphenyl. J. Dawson and R. H. 9,080. June 12.
Manufacture of Caustic Soda. F. Ellerhausen. 9,112. June 12.
Extraction of Precious Metals. R. D. Bowman and H. J. Anderson. 9,112. June 12.
Manufacture of Acid Phosphates for Manures.—(Complete Specification). H. H. Lake. 9,129. June 12.
Manufacture of Paper. J. Craig. June 13.
Smoke Consumption. J. Lever, J. Holland, and W. H. Todd. 9,139. June 13.
Electric Switches. F. M. Newton and T. Hawkins. 9,163. June 13.
Do. do. do. do. 9,164. June 13.
Do. do. do. do. 9,165. June 13.
Do. do. do. do. 9,166. June 13.
Treatment of Waste Animal Matter and Extraction of Fat therefrom. H. H. Lake. 9,176. June 13.
Extraction of Gold. C. R. Western. 9,182. June 13.
Recovery of Gaseous Products given off during Fermentation. C. L. Tichborne, A. E. Darley, M. F. Purcell, and S. Geoghegan. 9,183. June 13.
Utilization of Waste Potassium Salts. W. L. Wise. 9,198. June 13.
Artificial Fuel. J. Bowing. 9,199. June 13.
Manufacture of Ultramarine. R. W. E. MacIvor. 9,200. June 13.
Electro-Magnetic Separator. J. Ronczewski. 9,246. June 14.
Desilverising Lead. E. Edwards. 9,247. June 14.
Electrolytic Deposition of Aluminium. S. Wohle. 9,257. June 14.
Production of Colouring Matters. O. Imray. 9,258. June 14.

IMPORTS OF CHEMICAL PRODUCTS

LONDON.

k ending June 14th.

400 c. H. Wallace & Co.
170 P. Hecker & Co.

16 pks. Ohlenschlager Bros.

£37. Weatherley, M. & Co.
herwise undescribed

16 pks. O. Andrae & Co.

688 pks. Lister & Biggs

408 Bryce, Junr., & White

cid—

28 pks. Spies, Bros., & Co.

13 C. Christopherson & Co.

57 Beresford & Co.

y Ore—

29 t. Pillow, Jones, & Co.

20 H. R. Merton & Co.

95 E. J. Hudaberdoglie

las, 47 t. W. Balchin

11 c. L. & I. D. Jt. Co.

1d, 30 N. Z. Antimony Co.

8 H. Bath & Son

30 H. Emanuel

las, 3 F. Manders

1½ Rottman, Strome, & Co.

1—

Isles, 12 t. Falkland Islands

Co

£100. A. & M. Zimmermann

3 t. L. & I. D. Jt. Co.

9 Beresford & Co.

10 Goad, Rigg, & Co.

10

16—

1 t. R. Morrison & Co.

—

38 cks. Burrell & Co.

13 O'Hara & Hoar

22

50 pks. Magee, Taylor, & Co.

66 T. Rend

21 W. A. Rose & Co.

41 W. Harrison & Co.

10 cks. Coste & Co.

22 W. Harrison & Co.

ire—

40 t. Royal Mail S. P. Co.

Tartar—

2 pks. L. & I. D. Jt. Co.

2 Evans, Lescher, & Co.

10 W. C. Bacon & Co.

5 B. & F. Wf. Co.

5 W. C. Bacon & Co.

2 Evans, Lescher, & Co.

uo—

13 c. Kleinwort, Sons, & Co.

8 Stiebel Bros.

11 L. & I. D. Jt. Co.

137 Cundall & Co.

27 Kebbel, Son, & Co.

5 Hammond & Co.

ne, 30 Pickford & Co.

50 Kebbel, Son, & Co.

11 Elkan & Co.

10 L. & I. D. Jt. Co.

que, 114 c.

3 G. H. Penny & Co.

18 L. & I. D. Jt. Co.

6

50

2 J. Hale & Son

40 Potash—

11 pks. Petri Bros.

ls (*otherwise undescribed*)

£87. H. Boyce

8 T. H. Lee

700 A. & M. Zimmermann

22 F. Stahlschmidt & Co.

8 Kaul & Haenlein

20 L. & I. D. Jt. Co.

13 Pot. & M'ch's. Wvs. Co.

9 T. H. Lee

8—

to

7 pks. Hoare, Wilson, & Co.

38 pks. Anderson, Weber, & Smith

iod

51 t. G. T. Benton & Son

Cutch

Holland, 30 pks. J. Barber & Co.

Extracts

Adelaide, 100 pks. A. J. Humphrey

Holland, 1 G. Meyer & Co.

France, 25 T. H. Lee

120 L. J. Levinstein & Sons

U. S., 40 W. A. Bowditch

Halifax, 55 T. Ronaldson & Co.

Argols

Cape, 213 W. H. Cole & Co.

9 J. R. Thomson & Co.

Turmeric

E. Indies, 75 pks. L. & I. D. Jt. Co.

200 J. Graves

Cochin, 132 L. & I. D. Jt. Co.

448 J. P. Alpe & Co.

Fustic

Spain, 58 t. Churchill & Sim

Colon, 33

Indigo

E. Indies, 50 cts. L. & I. D. Jt. Co.

7 A. Harvey

1 T. H. Allan & Co.

20 F. W. Heilgers & Co.

7 W. Brandt, Sons, & Co.

47 L. & I. D. Jt. Co.

Holland, 2

W. Indies, 7 snrs. Chalmers, Guthrie, & Co.

E. Indies, 7 cts. Darling Bros.

2 L. & I. D. Jt. Co.

Myrabolams

E. Indies, 1,366 pks. W. Shilcott

1,558 L. & I. D. Jt. Co.

327 Hoare Wilson & Co.

4,833 Benecke, Souchay, & Co.

3,432 Beresford & Co.

2,029 Lewis & Peat

550 Beresford & Co.

6,860 J. P. Alpe & Co.

1,366

Yalonia

Smyrna, 35 t. A. & W. Nesbitt

63 J. Graves

Tanners' Bark

Melbourne, 31 t. Beresford & Co.

Durban, 25 A. & W. Nesbitt

Adelaide, 52 Baxter & Hoare

Natal, 21 Hicks, Nash, & Co.

Sydney, 41 Dalgety & Co.

Holland, 10 L. Henle

11 G. S. N. Co.

50 J. Graves

50 J. J. Williamson & Sons

New Zealand 8 Von der Meden & Co.

Adelaide, 120 Baxter & Hoare

Gambier

Singapore, 437 bls. Brinkmann & Co.

152 pks. Elkan & Co.

194 H. Lambert

353 S. Barrow & Bros.

213 W. H. Cole & Co.

109 Elkan & Co.

158 Lewis & Peat

292 J. H. & G. Scovell

422 Cox, Paterson, & Co.

432 R. J. Henderson

84 T. J. & T. Powell

Dyestuffs (*otherwise undescribed*)

U. S., 7 pks. Katrick & Co.

Canaries, 10 Kuhner & Henderson

Guano—

Brettesnoes, 200 t. J. Jensen & Co.

Pt. Stanley, 20 W. Horton & Yates

Lobos, 1,500 Anglo Contl. G. Wks.

1,882

Gutta-Percha—

Singapore, 110 c. Jackson & Till

106 Soundy & Co.

Glycerine—

Holland, £130. Beresford & Co.

Germany, 65 H. Lambert

Holland, 128 Burgoyne, Burdidge, & Co.

112 F. W. Heilgers & Co.

Germany, 180 Beresford & Co.

Holland, £500. Spies, Bros., & Co.

Glucose—

Germany, 800 pks. 800 cwt. J. Barber & Co.

50 420 Union Lighterage Co., Ltd.

400 400 J. Barber & Co.

24 240 Fellows, Morton & Co.

U. States, 500 500 L. & I. D. Jt. Co.

183 1,000 Horne & Co.

36 188 Union Lighterage Co., Ltd.

290 490 T. M. Duché & Son

Glucose—continued.

Germany, 100 pks. 100 cwt. J. Barber & Co.

100 100 Hyle, Nash, & Co.

700 700 J. Barber & Co.

25 117 J. Fink & Co.

400 400 Baxter & Hoare

200 200 Barrett, Tagant, & Co.

140 328 Props Chamberlain's Whf.

53 464 Sutro & Co.

26 208 T. M. Duché & Son

Isinglass—

E. Indies, 2 pks. Clarke & Smith

Penang, 4 L. & I. D. Jt. Co.

Manure—

Phosphate Rock

U. States, 2,486 t. Wyllie & Gordon

Montreal, 300 A. Hunter & Co.

Manure—

Belgium, 140 t. Odams' Chemical

155 A. Hunter & Co.

Holland, 155 Couper, Millar, & Co.

France, 260 Anglo Contl. G. Works

Holland, 224 T. Farmer & Co.

France, 112 Lawes' Manure Co., Ltd.

Holland, 225 A. Hunter & Co.

U. States, 218 C. A. & H. Nichols

Nitre—

Germany, 3 cks. Craven & Co.

Peru, 10 505 bgs. W. Montgomery & Co.

Naphtha—

Belgium, 8 drs. Domeier & Co.

France, 79 cks. Burt, Boulton, & Co.

Holland, 20 drs.

Oxalic Acid—

Norway, 76 pks. J. Kitchen, Ltd.

21 C. Atkins & Nisbet

Potash—

Germany, £225. G. Boor & Co.

Potashes—

Montreal, 150 c. Charles & Fox

235 S. Ward & Co.

Potassium Carbonate—

Germany, 41 cks. E. Cook & Co.

Pitch—

Holland, 12 cks. L. Fischel

Belgium, 20 Berlingina Bros. & Co.

Pyrites—

Lajaja, 500 t. Forbes, Abbott, & Co.

430 G. Ward & Sons

Spain, 1,428 Societe Commerciale, etc.

Potassium Sulphate—

Germany, 508 pks. Anglo Contl. Guano Works

Pearl Ashes—

France, 300 c. Petri Bros.

163

Paraffin Wax—

U. States, 120 bls. H. Hill & Sons

75 M. Dk. Co.

109 G. H. Frank

141 H. Hill & Sons

100 G. H. Frank

148 Rose, Wilson, & Rose

Plumbago—

E. Indies, 172 bls. J. Thredder Son, & Co.

57 H. W. Ison

58 Hoare, Wilson, & Co.

349 J. Thredder, Son, & Co.

723 H. W. Ison

Holland, 11 cs. G. Kahn & Co.

E. Indies, 4 J. Forsey

378 L. & I. D. Jt. Co.

108 Craven & Co.

53 L. & I. D. Jt. Co.

8 H. Johnson & Sons

171 T. Jordan & Co.

Germany, 50 cs. Beresford & Co.

Dyestuffs—		
Divi Divi		
Hamburg,	183 bgs.	
Maracaibo,	139 t.	D. Midgley & Sons
Logwood		
Hamburg,	6939 ps.	E. Brownbill & Co
Myrabolans		
Bombay,	1337	D. Sassoon & Co.
"	667	Beyts, Craig & Co.
"	1217	
"	3128 bgs.	D. Sassoon & Co
"	599	
Argols		
Oporto,	23 cks.	German Bank of London
Gambier		
Singapore,	633 bls.	National S. S. Co. Ltd.
Valonia		
Marathonisi,	54 sks.	Robinson & Hadwen
Sumac		
Palermo,	100 bgs.	
"	125	
Cutch		
Rangoon,	1245 bgs. 990 cs.	
Bombay,	1839 bxs	
Rangoon,	4981	
Turmeric		
Calcutta,	10 bgs.	
Fustic		
Savannah,	1478 lbs.	G. H. Muller
Colon,	1009 ps.	
Brazil,	143	
Extracts		
Baltimore,	52 brls.	Mucklow & Co.
Dyestuffs (otherwise undescribed)		
Colon,	25 bxs.	Chesney & Co.
Glucose—		
New York,	100 brls.	Richardson, Spence & Co.
"	49	
Hamburg,	33 cks.	
New York,	112 brls.	
Glycerine—		
Rotterdam,	1 dm.	
Horn Piths—		
Rouen,	a quantity,	Co-op. W'sale Soc.
Rio Grande du Sol,	15,000	Haycroft & Pethick
Paraffin Wax—		
Rangoon,	538 bxs.	
New York,	100 brls.	Meade-King & Robinson
Phosphate—		
Mentreal,	200 t.	
"	348	Phosphate of Lime Co.
"	100	
Pyrites—		
Huelva,	1,624 t.	Matheson & Co.
"	858	Tennants & Co.
"	1,407	Matheson & Co.
"	1,134	
Potash—		
Rouen,	42 dms. 59 cks.	Co-op. W'sale Society
Rotterdam,	38	
Pitch—		
Rouen,	25 cks.	Co-op. W'sale Soc.
Rotterdam,	40	
"	25	

Plumbago—		
Genoa,	80 bgs.	
Stearine—		
New York,	25 hds.	
Bordeaux,	6 cs.	
Antwerp,	39 bgs.	
Saltpetre—		
Calcutta,	171 bgs.	Ralli Bros.
Antwerp,	135	J. T. Fletcher & Co.
"	135 bgs.	
Hamburg,	100 cks. 39 brls.	
Sodium Acetate—		
Rouen,	9 cks.	Co-op. W'sale Soc.
Sulphur—		
Catania,	150 bgs.	
Sulphur Ore—		
Huelva,	1,544 t.	Matheson & Co.
Tartar—		
Naples,	6 cks. 1 cs.	
Bordeaux,	5	
Tartaric Acid—		
Rotterdam,	7 cks.	
Tartar Emetic—		
Hamburg,	12 cks.	
Turpentine—		
Savannah,	2,422 brls.	
Ultramarine—		
Hamburg,	30 cs.	
Rotterdam,	4 cks.	
Verdigris—		
Bordeaux,	2 cks.	
Zinc Oxide—		
Antwerp,	50 cks. J. T. Fletcher & Co.	
"	167	
"	75 brls. J. T. Fletcher & Co.	
"	125	
Zinc Sulphate—		
Rotterdam,	7 cks.	

GOOLE.

Week ending June 11th.

Alkali—		
Rotterdam,	1 ck.	
Antimony—		
Boulogne,	2 cks.	
Barytes—		
Rotterdam,	3 cks.	
Caoutchouc—		
Boulogne,	3 cks.	
Dyestuffs—		
Alizarine		
Rotterdam,	5 brls.	
Logwood		
Rotterdam,	3 cks.	
Monte Christi,	110 t.	
Belize,	354	
Monte Christi,	384	
Dyestuffs (otherwise undescribed)		
Boulogne,	71 cks. 5 cs. 3 pks.	
"	2	
Glucose—		
Hamburg,	140 bgs. 36 cks.	
"	120 24	
Potash—		
Rotterdam,	20 cks.	
Hamburg,	5 8 bgs.	
Calais,	3 15 drms.	
Dunkirk,	13 9	

Saltpetre—		
Rotterdam,	100 bgs.	
Sodium Nitrate—		
Rotterdam,	5 cks.	
Waste Salt—		
Hamburg,	110 t. 1,014 bgs.	
"	254	
"	203	
"	220 418 cks.	

HULL.

Week ending June 19th.

Albumen—		
Hamburg,	20 cks.	Wilson Sons & Co.
Acid—		
Rotterdam,	4 cks.	Hutchinson & Sons
Barytes—		
Antwerp,	21 cks.	H. F. Pudsey
Bremen,	22	Wilson Sons & Co.
"	9	Storry Smithson & Co.
"	19	Blundell Spence & Co.
Chemicals (otherwise undescribed)		
Hamburg,	39 pks. 5 cs.	Wilson Sons & Co.
Antwerp,	219	
Dunkirk,	259	
Christiania,	4 cks.	
Bremen,	2	J. Pyefinch & Co.
Rotterdam,	1 cs. W. & C. L. Ringrose	
Dunkirk,	306 pks.	Wilson Sons & Co.
Dyestuffs—		
Alizarine		
Rotterdam,	17 cks.	W. & C. L. Ringrose
"	10	Hutchinson & Son
"	13	W. & C. L. Ringrose
"	37 pks. W. & C. L. Ringrose	
"	52	Hutchinson & Son
Extracts		
Rouen,	22 cks.	Rawson & Robinson
Rennet		
Rotterdam,	1 ck.	G. Lawson & Sons
Copenhagen,	10	Wilson Sons & Co.
Logwood		
Boston,	50 brls.	
Glucose—		
Hamburg,	21 cks. Rawson & Robinson	
"	15	Woodhouse & Co.
New York,	50 brls.	
Hamburg,	23 cks. C. M. Lofthouse & Co.	
"	34 cks.	
Stettin,	1,200 bgs. C. M. Lofthouse & Co.	
"	14 200	Wilson Sons & Co.
"	200	
Pitch—		
Hamburg,	6 cks.	
Dunkirk,	64	
Phosphorus—		
Rouen,	10 cs.	Rawson & Robinson
Saltpetre—		
Hamburg,	2 cks.	Wilson Sons & Co.
"	10	Bailey & Leatham
Stearine—		
Rotterdam,	51 bgs.	Hornby & Needler

Tartaric Acid—		
Rotterdam,	4 cks.	W. & C. L.
Tar—		
Konigsberg,	25 cks.	
Turpentine—		
Libau,	50 cks.	

TYNE.

Week ending June 17th

Phosphate—		
Antwerp,	200 t. 1,000 bgs.	La Chemi
Waste Salt—		
Hamburg,	130 t.	

GRIMSBY.

Week ending June 14th

Chemicals (otherwise undesc.)		
Hamburg,	7 pks. 3 cs.	
Rotterdam,	2	
Glucose—		
Hamburg,	12 cks.	

GLASGOW.

Week ending June 19th

Charcoal—		
Montreal,	210 bgs.	
Dyestuffs—		
Madders		
Rotterdam,	2 cks.	J. Rankine
Marseilles,	5 brls.	Rob
"		M'Intosh
Rotterdam,	4 cks.	J. Rankine
Sumac		
Marseilles,	50 bgs.	
Extracts		
Antwerp,	2 cks.	
Marseilles,	57 brls.	
New York,	100 cs.	
Alizarine		
Rotterdam,	22 cks.	
"	63	J. Rankine
Glucose—		
New York,	125 brls.	
Gutta Percha—		
Rotterdam,	4 bsks.	J. Rankine
Manure—		
Phosphate Rock		
Bilbao,	2,250 t.	Coltness, I.
Aruba,	330	A. Cross
Stearine—		
St. John's, N.F.,	9 cks.	Th &
Tartaric Acid—		
Marseilles,	10 brls.	
Ultramarine—		
Antwerp,	13 cs.	
Zinc Oxide—		
Montreal,	100 cks.	
New York,	20 brls.	
Rotterdam,	125 cks.	J. Rankine

EXPORTS OF CHEMICAL PRODUCTS

OF

THE PRINCIPAL PORTS OF THE UNITED KINGDOM.**LONDON.**

Week ending June 11th.

Acids (otherwise undescribed)		
Lisbon,	11 pks.	£39
Ammonium Sulphate—		
Cologne,	37 t. 15 c.	£425
Antwerp,	130	1,560
Rotterdam,	11 13	130
Antwerp,	10 10	115
Ammonium Carbonate—		
Oporto,	11 c.	£25
Yokohama,	1 t. 10	57
Arsenic—		
Melbourne,	13 t.	£199
Yokohama,	1 10 c.	22
Bone Ash—		
Mauritius,	250	£1,115
Benzole Acid—		
New York,	6 cs.	£50

Carbon Bisulphide—		
Rotterdam,	5 t. 6 c	£63
Caustic Soda—		
Algoa Bay,	1 t. 1 c.	£58
Seville,	18	220
Copper Sulphate—		
Oporto,	4 t. 3 c.	£100
Bordeaux,	23	470
"	5	110
Genoa,	5	114
Bordeaux,	4	87
Genoa,	5	120
Lisbon,	5 18	120
Cream of Tartar—		
Sydney,	10 c.	£57
Normanton,	10	45
Townsville,	11	59
Adelaide,	1	51
Melbourne,	2 t.	210
"	10	51
Brisbane,	2	12
Christchurch,	5	27

Citric Acid—		
Hamburg,	6 cks.	£156
Santander,	1 c.	8
Adelaide,	10	70
Genoa,	1 t.	145
Rotterdam,	2	15
"		1 keg 8
Genoa,	2	150
Boulogne,	3	22
Rotterdam,	11	75
Christiania,	5½	35
Hamburg,	2	14
Sydney,	1	139
New York,	3 14	490
Brisbane,	1	8
Hamburg,	5	40
St. Petersburg,	10 kegs	74
Carbolic Solid—		
Barcelona,	8 c.	£23
New York,	16 cs.	58
Copperas—		
Varna,	16 t. 14 c.	£35

Carbolic Acid—		
Rotterdam,	2 t.	
Clarifiants—		
Bordeaux,	30 cks.	
Coal Products—		
Cresosote Salts		
Cologne,	407 bgs. 123 cks.	
Naphthalene		
Hamburg,	25 cks.	
Philadelphia,	99	
Barcelona,	5	
Le Treport,	2	
Anthracene		
Rotterdam,	20 cks.	
Dusseldorf,	146	
"	63	
Benzole		
Rotterdam,	20 cks.	
"	24	
"	12 drs.	
"	32	
Terneuzen,	32 dms.	
Rotterdam,	20 pns.	

25 rls.	£22
52	34
74	42
104	91
100 brls.	49
500	245
16 cks.	9
on, 140 dms.	11
ia, 300 kgs.	£35
81 bls	64
50	15
175 t.	767
149	216
25 cks.	60
1062	1,593
100 brls.	232
160	232
la (otherwise undescribed)	
22 cs.	£240
lo, 20 pks.	60
4 c.	60
69	259
20	54
3 cs.	24
15	140
35	74
tanta—	
20 cks.	£32
10 c. 200 gls.	25
32 pks.	51
a, 7 t.	£70
cau, 191	1,910
2	32
ue, 20 t.	£200
100	1,250
am, 100	1,250
s, 99	1,195
19 c.	500
50	30
3	1,445
170	7
700	1
60	300
80	1,080
31	320
10	2,708
338	11
old—	
1 t.	£30
ne, 1	42
m Chlorate—	
ong, 2 t.	£93
5 c.	
rus—	
2,300 lbs.	£168
18 c.	225
ong,	36
na,	172
1,500 lbs.	
1 t. 3 c.	£28
m Cyanide—	
7 c.	£22
crystals—	
ne, 1 t.	£43
m Iodide—	
urg, 2 c.	£64
m Prussiate—	
14 c.	£58
le Acid—	
ong,	£12
10 cs.	
8—	
1 t. 10 c.	£32
g, 2	44
1	21
3	65
1	27
osphate—	
ue, 20 t.	£70
220	781
30	105
Bicarbonate—	
12 c.	£12
Sulphate—	
ing, 150 t.	£150
ystals—	
le, 10 t. 18 c.	£33
Flowers—	
wn, 250 brls.	£146
lip—	
500 gls.	£59
oniac—	
1 t. 17 c.	£70
1	40
13	22
16	26
Silicate—	
1, 5 t. 1 c.	£27
Acid—	
ton,	£35
5 c.	133
1 t.	16

LIVERPOOL.

Week ending June 14th.

Ammonium Muriate—

Antwerp, 7 c. 3 q. £9

Alum Cake—

Dunedin, 2 t. 1 c. 3 q. £7

Alum—

Oran, 1 t. 12 c. £8

Galatz, 5 15 29

Havana, 2 3 3 q. 10

Leghorn, 5 6 25

Madras, 8 16 55

Malta, 1 5

Melbourne, 5 25

Montreal, 3 16 20

Baltimore, 36 16 2

Calcutta, 4 4 12

Constantinople, 2 17 14

Wellington, 1 1 5

Sydney, 1 1 5

Ibrail, 63 12 319

Volo, 1 8

Smyrna, 9 16 51

Odessa, 5 1 26

Kustendje, 1 5

Halifax, 5 15 28

Baltimore, 39 12 449

Ammonium Carbonate—

Vigo, 10 c. £23

Oporto, 1 t. 42

New York, 1 13 3 q. 35

Gothenburg, 5 9

Barcelona, 1 33

Ammonium Sulphate—

Rotterdam, 50 t. 11 c. 3 q. £570

Valencia, 103 2 2 1,218

50 4 500

50 10 585

Bleaching Powder—

Galatz, 29 cks. £30

New York, 83 25 bxs. 1,445

Rouen, 94 5,870

Trieste, 17 300

Baltimore, 91 cks. 1,080

Barcelona, 40 brls. 320

Boston, 702 2,708

Corunna, 16 dms. £30

Genoa, 209 42

Ghent, 277

Hamburg, 8

Havre, 15

Lisbon, 15 88 tcs. £93

Montreal, 15

Oporto, 100

Philadelphia, 114

Borate of Lime—

Rotterdam, 10 t. 4 c. 3 q. £120

Bone Waste—

Hamburg, 15 t. £50

Borax—

Rio de Janeiro, 12 c. £10

Valparaiso, 1 t. 5 38

Brimstone—

Otago, 51 t. 14 c. £214

Caustic Soda—

Alexandria, 16 dms.

Antwerp, 20

Batoum, 191

Boston, 150

Galatz, 29

Ibrail, 30

Maceio, 39 50 kgs.

Malaga, 28

Marseilles, 25

Monte Video, 25

Montreal, 40

Motril, 320

New York, 25 bxs.

Philadelphia, 135 brls.

Porto Cabello, 30

Rouen, 72

St. Petersburg, 3,428 dms.

Santander, 16 18 brls.

Seville, 65

Singapore, 45

Stettin, 163

Syra, 5

Valencia, 32

Vigo, 5

Alexandria, 26

Algiers, 20

Algoa Bay, 75 bxs.

Amsterdam, 70

Ancona, 25

Antwerp, 25

Barcelona, 50

Boston, 350

Calcutta, 3 cks.

Carthage, 20

Ceara, 10

Coruna, 16

Caustic Soda—continued.

Dunedin, 11 dms.

Galatz, 6

Genoa, 45

Hamburg, 33

Ibrail, 105

Lisbon, 90

Malaga, 100

Monte Video, 100

Montreal, 200

Napier, 3

Naples, 82

New York, 775

Odessa, 280

Oporto, 82

Philadelphia, 150 brls.

Rio Grande du Sol, 10 dms.

Rio Janeiro, 15

Rotterdam, 10

St. Petersburg, 708

San Francisco, 20 bxs. 100 dms.

Seville, 25 kgs. 62

Stettin, 16

Tampico, 20

Wellington, 15

Yokohama, 100

Chlorate—

Lisbon, 2 brls. £17

Caustic Potash—

San Francisco, 1 t. 13 c. £35

Naples, 10 25

Copperas—

Monte Video, 2 t. 18 c. 2 q. £6

Syra, 2 19 2 6

Calcium Chloride—

New York, 20 t. 5 c. £42

Carbolic Acid—

New York, 3 t. 14 c. £294

Rotterdam, 5 28

Hamburg, 13 3 q. 71

Genoa, 11 3 57

Rotterdam, 6 36

Copper Sulphate—

Alicante, 10 t. 2 c. 2 q. £113

Bilbao, 5 1 3 112

Rouen, 79 7 75

Barcelona, 19 15 2 429

Patras, 13 18

Bordeaux, 24 17 3 555

Genoa, 4 16 116

Gijon, 9 18 243

Trieste, 9 18 240

Bordeaux, 55 4 1 1,338

Nantes, 14 7 267

Bordeaux, 7 18 197

Santos, 10 15

Amsterdam, 8 2 9

Barcelona, 10 212

Bilbao, 14 7 3 357

Pasages, 30 910

Bordeaux, 27 8 1 597

Vigo, 10 3 13

Tarragona, 20 3 1 472

Trieste, 1 1 22

Genoa, 7 7 2 155

Iquique, 20 2 444

Ibrail, 5 3

Leghorn, 9 10 218

Sydney, 1 1 3 26

Barcelona, 3 3 80

Bilbao, 20 2 438

Bordeaux, 19 19 3 420

Melbourne, 12 5

Monte Video, 1 1 22

Calcutta, 2 10 51

Sydney, 1 24

Genoa, 20 2 420

Citric Acid—

Vigo, 3 c. £35

Calcutta, 7 2 q. 28

Chemicals (otherwise undescribed)

New York, 7 c. 2 q. £165

Disinfectants—

Kurrachee, 23 pks. £9

Calcutta, 3 cs. 6

Epsom Salts—

Rio Janeiro, 50 kgs. 10 brls.

Seville, 10 cks.

Valparaiso, 10 cks.

Glycerine—

Hamburg, 7 t. 17 c. £182

Ground Spar—

Hamburg, 30 t. 16 c. £250

Guano—

Barcelona, 20 t. 7 c. 1 q. £198

Gypsum—

New York, 10 t. 1 c. £30

Magnesia—

Valparaiso, 50 cs.

Constantinople, 2

Vera Cruz, 2 cks. 3

Magnesium Chlorate—

Bombay, 2 t. 4 c. 3 q. £6

Montreal, 13 34

Oxalic Acid—

Rouen, 2 t. 3 c. £75

Mexico City, 2 16

Pitch—

Sydney, 6 brls.

Demerara, 14

Potash—

B. Ayres, 1 t. 2 c. £22

Potassium Nitrate—

Carthage, 4 t. 17 c. 2 q. £90

Potassium Carbonate—

Boston, 13 t. 15 c. £186

Potassium Cyanide—

Halifax, 1 cs. £8

Phosphorus—

B. Ayres, 4 c. 2 q. £335

Vera Cruz, 2 16

Phosphates—

Hamburg, 20 t. 2 c. £100

Philadelphia, 10 c. 110

Phosphate of Lime—

Philadelphia, 10 c. £140

Potassium Chlorate—

Shanghai, 4 t. 10 c. £189

Mexico City, 10 21

Palermo, 10 25

Odessa, 1 50

Philadelphia, 2 105

St. Petersburg, 15 750

Shanghai, 2 10 125

Vigo, 1 42

Naples, 10 25

10 25

Soda Ash—

Baltimore, 307 cks. 344 tcs.

Barcelona, 217 60 brls. 500 bgs. 155

Boston, 217 600 brls.

B. Ayres, 76 36

Leghorn, 76 36

Melbourne, 76 36

Montreal, 149 35

New York, 149 35

Odessa, 5

Philadelphia, 60

Rio Janeiro, 140

Smyrna, 70

Baltimore, 378 cks.

Boston, 46

Monte Video, 200

Salt—continued.		
Port Natal,	188 t.	
St. John's, Nfld.,	4	
Bilbao,		5 c.
Calcutta,	2,556	
Demerara,	27	
Ghent,	150	
Iceland,	479	
Manaos,	96	
Melbourne,	102	
Monte Video,	28	
Montreal,	313	
New York,	405	
Para,	507½	
Seville,	30 cs.	
Trinidad,	36	3
Valparaiso,	8	9
Wilmington,	320	
Port Natal,	75	
Quebec,	500	
St. John's, Nfld.,		20 cs.
San Francisco,	199½	
Sherbro,	100	9 c.
Talcuano,	120	
Trinidad,	37	
Valparaiso,	301	
Wellington,	518	
Quebec,	416	

Sodium Silicate—		
Zante,	5 brls.	
Galatz,	15	
Genoa,	17	

Sugar of Lead—		
Colon,	4 c.	£5

Salt Cake—		
Baltimore,	101 t.	10 c.
	204	355

Sodium Borate—		
Hamburg,	17 t.	18 c.
Rotterdam,	1	2
St. Petersburg,	15	10
Stettin,	1	15

Sodium Chlorate—		
Mexico City,	5 c.	£14

Salammoniac—		
Antwerp,	5 c.	3 q.
Alexandria,	1 t.	1
Patras,	9	17
Larnaca,	1	2
Malta,	8	15
Patras,	5	2
Naples,	9	1
Salaora,	6	10
Volo,	11	19
Genoa,	8	14

heep Dip—		
Algoa Bay,	2 t.	5 c.
Natal,	1	10
B. Ayres,	3	1 q.
New York,	4	4
Algoa Bay,	1	9
E. London,	15	40
Monte Video,		300 drs.
B. Ayres,	12	106

Saltpetre—		
Rio Grandé du Sol,	6 c.	
Toronto,	6	7

Sulphur—		
Maceio,	1 t.	10 c.
Madras,	4	15
New York,	11	8
Oporto,	181	733
Boston,	75	3
Rangoon,	5	28
Boston,	25	109

Tartar—		
Bordeaux,	6 t.	£570

Tar—		
Santander,		
Zinc Chlorate—		
Rotterdam,	5 t.	8 c.

TYNE.

Week ending June 17th.

Alumina Sulphate—		
Passages,	21 t.	14 c.
Anthracene—		
Rotterdam,	9 t.	19 c.
Ammonium Sulphate—		
Hamburg,	50 t.	
Odense,	5	
Alkali—		
Copenhagen,	6 t.	7 c.
Rotterdam,	4	16
Stockholm,	2	18
Gefle,	1	2
Leghorn,	11	10
S. Petersburg,	51	8
Christiania,	6	8
Gothenburg,	18	9
Rotterdam,	5	6
Riga,	16	11

Alum—		
Passages,	25 t.	2 c.
Bleaching Powder—		
Copenhagen,	16 t.	2 c.
Rotterdam,	27	3
Danzig,	9	
Newfairwater,	56	9
Lisbon,	4	19
New York,	100	3
Stockholm,	3	
Genoa,	15	
S. Petersburg,	191	18
Bilbao,	20	1
Abo,	24	1
Antwerp,	17	11
Genoa,	10	1
Hamburg,	12	14
"	21	2
Passages,	10	
Montreal,	25	17
Christiania,	5	2
Esbjerg,	1	3
Odense,	1	15
Rotterdam,	6	1
"	9	11
"	10	9
St. Petersburg,	105	2
Riga,	17	4

Barytes—		
Rotterdam,	2 t.	4 c.

Copperas—		
Genoa,	5 t.	5 c.
Vienna,	3	19
Esbjerg,	6	2

Caustic Soda—		
Copenhagen,	4 t.	7 c.
Rotterdam,	2	12
Reval,	5	16
Newfairwater,	20	
Gefle,	4	
Genoa,	34	16
Naples,	17	
St. Petersburg,	37	7
Antwerp,	8	3
Hamburg,	3	14
Rotterdam,	4	18
Riga,	20	6

Ferro Manganese—		
Bilbao,	44 t.	14 c.

Gypsum—		
New York,	38	16 c.

Litharge—		
Copenhagen,	1 t.	9 c.
Newfairwater,	1	
Riga,	11	2
Hamburg,	2	15

Magnesia—		
Newfairwater,	12 c.	
Hamburg,	4	

Oxalic Acid—		
New York,	10 t.	6 c.

Potassium Chlorate—		
Genoa,	1	5
St. Petersburg,	2	10
Rotterdam,	6	c.

Phosphorus—		
Malmo,	4 c.	

Salammoniac—		
St. Petersburg,	17 t.	15 c.

Sulphur—		
Rotterdam,	8 t.	16 c.

Soda—		
Copenhagen,	26 t.	18 c.
Libau,	25	6
Rotterdam,	10	17
Stockholm,	18	12
Gefle,	35	3
St. Petersburg,	4	19
Montreal,	40	11
Christiania,	10	3
Antwerp,	5	
Aarhus,	24	15

Esbjerg,		
Odense,	22	10
Rotterdam,	29	7
"	11	10
Horsens,	8	3
Svendborg,	4	5
Randers,	22	10

Soda Ash—		
Libau,	20 t.	6 c.
Newfairwater,	70	19
Lisbon,	5	17
Genoa,	9	19
Abo,	2	19
Christiania,	9	19
Hamburg,	7	12
Gothenburg,	98	11

Sodium Sulphate—		
Aarhus,	21 t.	11 c.
Sodium Chlorate—		
Rotterdam,	1 t.	16 c.
Superphosphate—		
Libau,	770 t.	1 c.
Riga,	200	6
"	339	1
Sodium Hyposulphate—		
Antwerp,	1 t.	6 c.
Zinc Ashes—		
Copenhagen,	10 c.	

GLASGOW.

Week ending June 19th.

Ammonium Sulphate—		
Trinidad,	7 t.	3½ c.
Demerara,	5	17½
"	50	13½
Mauritius,	9	15½
Nantes,	70	8½

Benzole—		
Dieppe,	185 brls.	15 pns.

Bleaching Powder—		
Sydney,	6 t.	3 c.

Gaoutchoue—		
Rangoon,	34 c.	£232

Copperas—		
Karachi,	11 t.	5 c.

Copper Sulphate—		
Nantes,	21 t.	12½ c.

Chemicals (otherwise undescribed)		
Rangoon,	18½ c.	£20

Dyestuffs—		
Extracts		
Quebec,	98½ c.	£146
Oporto,	5 t.	15½
Montreal,	161½	250
"	87	98

Argols		
Quebec,	22½ c.	£21

Logwood		
Quebec,	443½ c.	£165
Montreal,	573½	207

Epsom Salts—		
Christiania,	50 bgs.	£40
Calcutta,	6 t.	1½ c.

Guanine—		
Demerara,	10 t.	£105

Litharge—		
Quebec,	4 t.	9½ c.
Karachi,	2	2½

Manure—		
Trinidad,	127 t.	1½ c.
"	140	6
Demerara,	10	80
"	10	95
Mauritius,	54	9
"	3	½
Penang,	200	10
"	200	13 c.

Manganese Oxide—		
New York,	228 c.	£93

Nitric Acid—		
Bombay,	1 t.	7 c.

Naptha—		
Rouen,	50 cks.	£450

Potassium Bichromate—		
Quebec,	9 t.	9½ c.
"	4	3
Oporto,	1	1½
Rouen,	16	6½
Antwerp,		510
Karachi,	3	9½

Potassium Carbonate—		
Karachi,	1 t.	18 c.

Paraffin Wax—		
Hong Kong,	1 t.	18½ c.
Nantes,	18	16½
Japan,		4½

Potassium Chloride—		
Passages,	5 t.	¾ c.

Potassium Prussiate—		
New York,	5 t.	9 c.

Sulphuric Acid—		
Rangoon,	12 t.	2½ c.
Bombay,	20	12

Soda Ash—		
New York,	176½	£49

Sodium Bichromate—		
Quebec,	5 t.	16½ c.
Karachi,		33½

Verdigris—		
New York,		£200

HULL.

Week ending June 17th.

Bleaching Powder—		
Bremen,		10 cks.
Drontheim,		59
Rotterdam,		7

Barytes—		
Stettin,	150 t.	

Caustic Soda—		
Amsterdam,	20 drms.	
Bergen,	4	
Gothenburg,	248	
Konigsberg,	105	
Libau,	145	
Riga,	465	
St. Petersburg,	450	

Chemicals (otherwise undescribed)		
Antwerp,	1 cs.	2 cks.
Amsterdam,	1	1
Boston,		36
Bombay,		542
Bordeaux,	20	50
Bremen,	2	6
Christiania,	5	27
Copenhagen,	11	82
Danzig,	15	36
Gothenburg,	14	44
Ghent,	4	40
Hamburg,	25	8
Helsingfors,	1	
Konigsberg,	29	20
Lisbon,	1	
Libau,		85
New York,	25	6
Rotterdam,	31	1
Rouen,	36	
St. Petersburg,	5	2
Stettin,	24	123
Stavanger,	1	1
Stockholm,	1	10
Wyburg,		1

Dyestuffs (otherwise undescribed)		
Antwerp,	8 cks.	
Amsterdam,	2	
Boston,	4	
Bombay,	16	1 drum
Reval,	3	1 cs.
Rotterdam,	33	4 kgs.
St. Petersburg,		2 cs.</

PRICES CURRENT.

WEDNESDAY, JUNE 25, 1890.

PREPARED BY HIGGINBOTTOM AND CO., 116, PORTLAND STREET, MANCHESTER.

The values stated are F.O.R. at maker's works, or at usual ports of shipment in U.K. The price in different localities may vary.

Acids:—		£	s.	d.
Acetic, 25 % and 40 %	per cwt.	7/-	&	12/3
" Glacial	"	64/-		
Arsenic, S.G., 2000°	"	0	12	9
Chromic 82 %	nett per lb.	0	0	6½
Fluoric	"	0	0	3½
Muriatic (Tower Salts), 30° Tw.	per bottle	0	0	8
" (Cylinder), 30° Tw.	"	0	2	11
Nitric 80° Tw.	per lb.	0	0	2
Nitrous	"	0	0	1¼
Oxalic	nett	0	0	3½
Picric	"	0	1	1
Sulphuric (fuming 50 %)	per ton	15	10	0
" (monohydrate)	"	5	10	0
" (Pyrites, 168°)	"	3	2	6
" (" 150°)	"	1	4	6
" (free from arsenic, 140/145°)	"	1	7	6
Sulphurous (solution)	"	2	15	0
Tannic (pure)	per lb.	0	1	1
Tartaric	"	0	1	2½
Arsenic, white powdered	per ton	13	0	0
Alum (loose lump)	"	4	17	6
Alumina Sulphate (pure)	"	5	0	0
" (medium qualities)	"	4	10	0
Aluminium	per lb.	0	15	0
Ammonia, 880 = 28°	per lb.	0	0	3
" = 24°	"	0	0	1¼
" Carbonate	nett	0	0	3½
" Muriate	per ton	23	0	0
" (sal-ammoniac) 1st & 2nd	per cwt.	37/-	&	35/-
" Nitrate	per ton	40	0	0
" Phosphate	per lb.	0	0	10½
" Sulphate (grey), London	per ton	11	2	6
" (grey), Hull	"	11	2	6
Aniline Oil (pure)	per lb.	0	0	10½
Aniline Salt	"	0	0	9
Antimony	per ton	75	0	0
" (tartar emetic)	per lb.	0	1	1
" (golden sulphide)	"	0	0	10
Barium Chloride	per ton	8	7	6
" Carbonate (native)	"	3	12	6
" Sulphate (native levigated)	"	45/-	to	75/-
Bleaching Powder, 35 %	"	4	15	0
" Liquor, 7 %	"	2	10	0
Bisulphide of Carbon	"	13	0	0
Chromium Acetate (crystal)	per lb.	0	0	6
Calcium Chloride	per ton	2	2	6
China Clay (at Runcorn) in bulk	"	17/6	to	35/-
Coal Tar Dyes:—				
Alizarine (artificial) 20 %	per lb.	0	0	9
Magenta	"	0	3	9
Coal Tar Products				
Anthracene, 30 % A, f.o.b. London	per unit per cwt.	0	1	5
Benzol, 90 % nominal	per gallon	0	3	9
" 50/90	"	0	2	9
Carbolic Acid (crystallised 35°)	per lb.	0	0	7¼
" (crude 60°)	per gallon	0	2	2
Creosote (ordinary)	"	0	0	2½
" (filtered for Lucigen light)	"	0	0	3
Crude Naphtha 30 % @ 120° C.	"	0	1	4
Grease Oils, 22° Tw.	per ton	3	0	0
Pitch, f.o.b. Liverpool or Garston	"	1	8	0
Solvent Naphtha, 50 % at 160°	per gallon	0	1	9
Coke-oven Oils (crude)	"	0	0	2½
Copper (Chili Bars)	per ton	59	5	0
" Sulphate	"	22	0	0
" Oxide (copper scales)	"	57	10	0
Glycerine (crude)	"	30	0	0
" (distilled S.G. 1250°)	"	60	0	0
Iodine	nett, per oz.	0	0	9
Iron Sulphate (copperas)	per ton	1	10	0
" Sulphide (antimony slag)	"	2	0	0
Lead (sheet) for cash	"	14	10	0
" Litharge Flake (ex ship)	"	15	15	0
" Acetate (white ")	"	24	0	0
" (brown ")	"	18	5	0
" Carbonate (white lead) pure	"	19	0	0
Nitrate	"	22	0	0
Lime, Acetate (brown)	"	7	7	6
" (grey)	per ton	13	0	0
Magnesium (ribbon and wire)	per oz.	0	2	3
" Chloride (ex ship)	per ton	2	5	0
" Carbonate	per cwt.	1	17	6
" Hydrate	"	0	10	0
" Sulphate (Epsom Salts)	per ton	3	0	0
Manganese, Sulphate	"	17	10	0
" Borate (1st and 2nd)	per cwt.	60/-	&	42/6
" Ore, 70 %	per ton	4	10	0
Methylated Spirit, 61° O.P.	per gallon	0	2	2
Naphtha (Wood), Solvent	"	0	3	10
" Miscible, 60° O.P.	"	0	4	3
Oils:—				
Cotton-seed	per ton	22	10	0
Linseed	"	26	0	0
Lubricating, Scotch, 890°—895°	"	7	5	0
Petroleum, Russian	per gallon	0	0	5½
" American	"	0	0	5½
Potassium (metal)	per oz.	0	3	10
" Bichromate	per lb.	0	0	4
" Carbonate, 90% (ex ship)	per ton	19	10	0
" Chlorate	per lb.	0	0	4½
" Cyanide, 98%	"	0	2	0
" Hydrate (Caustic Potash) 80/85 %	per ton	22	10	0
" (Caustic Potash) 75/80 %	"	21	10	0
" (Caustic Potash) 70/75 %	"	20	15	0
" Nitrate (refined)	per cwt.	1	2	6
" Permanganate	"	4	2	6
" Prussiate Yellow	per lb.	0	0	9½
" Sulphate, 90 %	per ton	9	10	0
" Muriate, 80 %	"	7	15	0
Silver (metal)	per oz.	0	3	11½
" Nitrate	"	0	2	8
Sodium (metal)	per lb.	0	4	0
" Carb. (refined Soda-ash) 48 %	per ton	6	0	0
" (Caustic Soda-ash) 48 %	"	5	0	0
" (Carb. Soda-ash) 48 %	"	5	5	0
" (Carb. Soda-ash) 58 %	"	6	5	0
" (Soda Crystals)	"	2	17	6
" Acetate (ex-ship)	"	16	0	0
" Arseniate, 45 %	"	11	0	0
" Chlorate	per lb.	0	0	6½
" Borate (Borax)	nett, per ton	29	0	0
" Bichromate	per lb.	0	0	3
" Hydrate (77 % Caustic Soda) (f.o.b.)	per ton	9	15	0
" (74 % Caustic Soda)	"	9	5	0
" (70 % Caustic Soda)	"	8	15	0
" (60 % Caustic Soda, white) (f.o.b.)	"	7	15	0
" (60 % Caustic Soda, cream)	"	7	10	0
" Bicarbonate	"	5	15	0
" Hyposulphite	"	5	10	0
" Manganate, 25%	"	9	0	0
" Nitrate (95 %) ex-ship Liverpool	per cwt.	0	8	1½
" Nitrite, 98 %	per ton	28	0	0
" Phosphate	"	15	15	0
" Prussiate	per lb.	0	0	7½
" Silicate (glass)	per ton	5	7	6
" (liquid, 100° Tw.)	"	3	17	6
" Stannate, 40 %	per cwt.	2	2	6
" Sulphate (Salt-cake)	per ton	1	7	6
" (Glauber's Salts)	"	1	10	0
" Sulphide	"	7	15	0
" Sulphite	"	5	5	0
Strontium Hydrate, 98 %	"	8	0	0
Sulphocyanide Ammonium, 95 %	per lb.	0	0	7½
" Barium, 95 %	"	0	0	5½
" Potassium	"	0	0	8
Sulphur (Flowers)	per ton	7	10	0
" (Roll Brimstone)	"	6	0	0
" Brimstone: Best Quality	"	4	7	6
Superphosphate of Lime (26 %)	"	2	7	6
Tallow	"	25	10	0
Tin (English Ingots)	"	99	0	0
" Crystals	per lb.	0	0	6½
Zinc (Spelter)	per ton	23	10	0
" Chloride (solution, 96° Tw.	"	6	0	0

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Salt—continued.

Port Natal,	188 t.	
St. John's, Nfld.,	4	5 c.
Bilbao,		
Calcutta,	2,556	
Demerara,	27	
Ghent,	150	
Iceland,	479	
Manaos,	96	
Melbourne,	102	
Monte Video,	28	
Montreal,	313	
New York,	405	
Para,	507½	
Seville,	30 cs.	
Trinidad,	36	3
Valparaiso,	8	9
Wilmington,	320	
Port Natal,	75	
Quebec,	500	
St. John's, Nfld.,		20 cs.
San Francisco,	199½	
Sherbro,	100	9 c.
Talcahuano,	120	
Trinidad,	37	
Valparaiso,	301	
Wellington,	518	
Quebec,	416	

Sodium Silicate—

Zante,	5 brls.	
Galatz,	15	
Genoa,	17	

Sugar of Lead—

Colon,	4 c.	£5
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Salt Cake—

Baltimore,	101 t.	10 c.	£177
"	204		355

Sodium Biforate—

Hamburg,	17 t.	18 c.	2 q.	£539
Rotterdam,	1	1	2	33
St. Petersburg,	15	10	1	466
Stettin,	1	15	1	53

Sodium Chlorate—

Mexico City,	5 c.	£14
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Salammoniac—

Antwerp,	5 c.	3 q.	£10
Alexandria,	1 t.	1	28
Patras,	9		17
Larnaca,	1	2	38
Malta,	8		15
Patras,	5	2	9
Naples,	9	1	16
Salaora,	6		10
Volo,	11		19
Genoa,	8		14

heep Dip—

Algoa Bay,	2 t.	5 c.	£125
Natal,	1	10	80
B. Ayres,	3	1 q.	8
New York,	4	4	60
Algoa Bay,	1	9	57
E. London,	15		40
Monte Video,		300 drs.	106
B. Ayres,	12		20

Saltpetre—

Rio Grandé du Sol,	6 c.	7
Toronto,	6	6

Patras,	5
Naples,	9
Salaora,	6

Tartar—

Bordeaux,	6 t.	£570
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Tar—

Santander,		
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Zinc Chlorate—

Rotterdam,	5 t.	8 c.	£36
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TYNE.

Week ending June 17th.

Alumina Sulphate—

Pasages,	21 t.	14 c.
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Anthracene—

Rotterdam,	9 t.	19 c.
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Ammonium Sulphate—

Hamburg,	50 t.	
Odense,	5	

Alkali—

Copenhagen,	6 t.	7 c.
Rotterdam,	4	16
Stockholm,	2	18
Gefle,	1	2
Leghorn,	11	10
S. Petersburg,	51	8
Christiania,	6	8
Göteborg,	18	9
Rotterdam,	5	6
Riga,	16	11

Alum—

Pasages,	25 t.	2 c.
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Bleaching Powder—

Copenhagen,	16 t.	2 c.
Rotterdam,	27	3

"

Danzig,	1	4
Newfairwater,	56	9
Lisbon,	4	19
New York,	100	3
Stockholm,	3	
Genoa,	15	
S. Petersburg,	191	18
Bilbao,	20	1
Abo,	24	1
Antwerp,	17	11
Genoa,	10	1
Hamburg,	12	14
"	21	2
Pasages,	10	
Montreal,	25	17
Christiania,	5	2
Esbjerg,	1	3
Odense,	1	15
Rotterdam,	6	1
"	9	11
"	10	9
St. Petersburg,	105	2
Riga,	17	4

Barytes—

Rotterdam,	2 t.	4 c.
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Copperas—

Genoa,	5 t.	5 c.
Vienna,	3	19
Esbjerg,	6	2

Caustic Soda—

Copenhagen,	4 t.	7 c.
Rotterdam,	2	12
Reval,	5	16
Newfairwater,	20	
Gefle,	4	
Genoa,	34	16
Naples,	17	
St. Petersburg,	37	7
Antwerp,	8	3
Hamburg,	3	14
Rotterdam,	4	18
Riga,	20	6

Ferro Manganese—

Bilbao,	44 t.	14 c.
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Gypsum—

New York,	38	16 c.
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Litharge—

Copenhagen,	1 t.	9 c.
Newfairwater,	1	
Riga,	11	2
Hamburg,	2	15

Magnesia—

Newfairwater,	12 c.	
Hamburg,	4	

Oxalic Acid—

New York,	10 t.	6 c.
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Potassium Chlorate—

Genoa,	1	5
St. Petersburg,	2	10
Rotterdam,	6	c.

Phosphorus—

Malmo,	4 c.	
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Salammoniac—

St. Petersburg,	17 t.	15 c.
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Sulphur—

Rotterdam,	8 t.	16 c.
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Soda—

Copenhagen,	26 t.	18 c.
Libau,	25	6
Rotterdam,	10	17
Stockholm,	18	12
Gefle,	35	3
St. Petersburg,	4	19
Montreal,	40	11
Christiania,	10	3
Antwerp,	5	
Aarhus,	24	15
"	23	
Esbjerg,	12	4
Odense,	22	10
Rotterdam,	29	7
"	11	10
Horsens,	8	3
Svendborg,	4	5
Randers,	22	10

Soda Ash—

Libau,	20 t.	6 c.
Newfairwater,	70	19
Lisbon,	5	17
Genoa,	9	19
Abo,	2	17
Christiania,	9	9
Hamburg,	7	12
Göteborg,	98	11

Sodium Sulphate—

Aarhus,	21 t.	11 c.
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Sodium Chlorate—

Rotterdam,	1 t.	16 c.
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Superphosphate—

Libau,	770 t.	1 c.
Riga,	200	6
"	339	1

Sodium Hyposulphate—

Antwerp,	1 t.	6 c.
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Zinc Ashes—

Copenhagen,	10 c.	
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GLASGOW.

Week ending June 19th.

Ammonium Sulphate—

Trinidad,	7 t.	3½ c.	£82
Demerara,	5	17½	62
"	50	13½	571
Mauritius,	9	15½	100
Nantes,	70	8½	875

Benzole—

Dieppe,	185 brls.	15 pns.	£1,045
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Bleaching Powder—

Sydney,	6 t.	3 c.	£38
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Caoutchouc—

Rangoon,	34 c.	£232
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Copperas—

Karachi,	11 t.	5 c.	£22
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Copper Sulphate—

Nantes,	21 t.	12½ c.	£387
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Chemicals (otherwise undescribed)

Rangoon,	18½ c.	£20
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Dyestuffs—	
Extracts	
Quebec,	98½ c.

Argols

Quebec,	22½ c.	£21
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Logwood

Quebec,	443½ c.	£165
Montreal,	573½	207

Quebec,	443½ c.
Montreal,	573½

Guano—

Demerara,	10 t.	£105
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Litharge—

Quebec,	4 t.	9½ c.	£72
Karachi,	2	2½	31

Manure—

Trinidad,	127 t.	1½ c.	£1,205
"	140	6	1,114
"	10		80
Demerara,	10		95
"	54	9	536
Mauritius,	3	½	80
"	200	10	1,554
Penang,	200	13 c.	2,100

Manganese Oxide—

New York,	228 c.	£93
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Nitric Acid—

Bombay,	1 t.	7 c.	£43 15s.
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Naptha—

Rouen,	50 cks.	£450
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Potassium Bichromate—

Quebec,	9 t.	9½ c.	£318
"	4	3	154
Oporto,	1	1½	36
Rouen,	16	6½	549
Antwerp,			510
Karachi,	3	9½	123

Potassium Carbonate—

Karachi,	1 t.	18 c.	£33
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Paraffin Wax—

Hong Kong,	1 t.	18½ c.	£53
Nantes,	18	16½	480
Japan,		4½	6

Potassium Chloride—

Pasages,	5 t.	¾ c.	£50
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Potassium Prussiate—

New York,	5 t.	9 c.	£361
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Sulphuric Acid—

Rangoon,	12 t.	2½ c.	£132
Bombay,	20	12	103

Soda Ash—

New York,	176½	£49
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Sodium Bichromate—

Quebec,	5 t.	16½ c.	£154
Karachi,		3¾	44

Verdigris—

New York,		£200
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HULL.

Week ending June 17th.

Bleaching Powder—

Bremen,	10 cks.	
Drontheim,	59	
Rotterdam,	7	

Barytes—

Stettin,	150 t.	
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Caustic Soda—

Amsterdam,	20 drms.	
Bergen,	4	
Göteborg,	248	
Königsberg,	105	
Libau,	145	
Riga,	405	
St. Petersburg,	450	

Chemicals (otherwise undescribed)

Antwerp,	1 cs.	2 cks.	48
Amsterdam,	1		36
Boston,	20		
Bombay,		542	235
Bordeaux,	20		
Bremen,	2	6	
Christiania,	5	27	82
Copenhagen,	11		
Danzig,	15	36	
Göteborg,	14	44	3
Ghent,	4	40	
Hamburg,	25	8	
Helsingfors,	1		
Königsberg,	29	20	
Lisbon,	1		
Libau,		85	
New York,	25	6	
Rotterdam,	31	1	
Rouen,	36		
St. Petersburg,	5	2	20
Stettin,	24	123	
Stavanger,	1		
Stockholm,	1	10	
Wyburg,		1	

Dyestuffs (otherwise undescribed)

Antwerp,	8 cks.	
Amsterdam,	2	
Boston,	4	
Hamburg,	16	1 drum
Reval,	3	1 cs.
Rotterdam,	33	4 kgs.
St. Petersburg,	2	cs.
Stettin,		300 bgs.
Melbourne,	2 cks.	
Stettin,	484 bgs.	

Pitch—

Antwerp,	446 t.	
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Tar—

Amsterdam,	5 cks.	
Hamburg,	2	
Stockholm,	5	

GOOLE.

Week ending June 11th.

Benzole—

Calais,	25 cks.	
Rotterdam,	48	

Chemicals (otherwise undescribed)

Dunkirk,	36 cks.	
Ghent,	2	

Caoutchouc—

Boulogne,	4 cks.	
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Dyestuffs (otherwise undescribed)

Boulogne,	3 cs.	5 cks.
Ghent,	30 bgs.	12 tins.
Rotterdam,	66 bgs.	
"	85	

Manure—

Rotterdam,	176 bgs.	
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Pitch—

Antwerp,	737 t.	
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GRIMSBY.

Week ending June 14th.

Coal Products—

Dieppe,	98 cks.	
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The Office will be held subject to three months either side.

The make of Gas is about 300 million feet per day. Applications, stating age, qualifications, employment, and amount of salary required, not more than three recent testimonials, must be forwarded not later than the 22nd of December, endorsed "Gas Manager."

Any applicant canvassing will be disqualified. **GEORGE BAINBRIDGE**
Municipal Buildings, Middlesbrough,
Dec. 24, 1889.

THE Corporation of Middlesbrough prepared to receive TENDERS for the SULPHURIC ACID required at their Works for the Fifteen months ending the 31st of March. Further particulars may be obtained from the Gas Manager, Middlesbrough.

Tenders, addressed to the Chairman of the Committee, to be delivered at my Office, on or before the 15th of January, 1890, endorsed "Sulphuric Acid."

The Corporation do not bind themselves to accept the lowest or any tender.

FREDERICK ENTWISTLE
Town Hall, Middlesbrough, near Manchester,
Dec. 24, 1889.

HALIFAX CORPORATION GAS.
THE Halifax Corporation prepared to receive TENDERS (a) for SULPHURIC ACID, and (b) for the purchase of IRON for the year ending December, 1890.

Full particulars and form of Tender may be obtained on application to Mr. Thomas Holgate, F.C.S., Halifax.

Sealed tenders, endorsed "Sulphuric Acid," as the case may be, to be sent to the Corporation not later than Twelve o'clock, on the 15th of January, 1890.

The Corporation do not bind themselves to accept the lowest, highest, or any tender.—By order,

KEIGHLEY WALTON
Town Hall, Halifax, Dec. 27, 1889.

Miscellaneous.

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Any applicant canvassing will be disqualified. GEORGE BAINBRIDGE,

Municipal Buildings, Middlesbrough,
Dec. 24, 1889.

THE Corporation of Middle

ton prepared to receive TENDERS for the supply of the SULPHURIC ACID required at their Gas Works, for the Fifteen months ending the 31st of March, 1890.

Further particulars may be obtained from the Gas Manager, Middleton.

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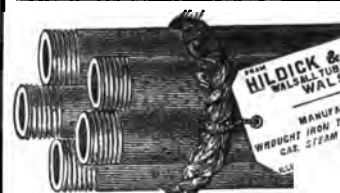
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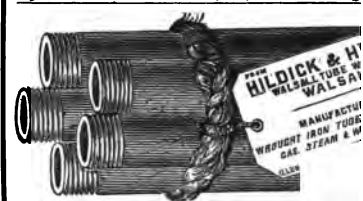
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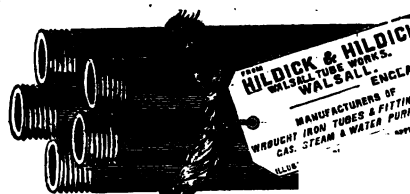
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By order of the Gas Committee,

WM. HENRY TALBOT

Town Hall, 9th May, 1890.

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Manchester Corporation are prepared to
TENDERS for the PURCHASE and REMOVAL
of the SPENT OXIDE to be produced at their
Rochdale-road, and Bradford-road Works durin
of one, two, or three years from the 30th June n
The Committee do not bind themselves to
highest or any tender.

Sealed tenders, addressed to the Chairman
Committee, and endorsed "Tender for Spent Ox
be delivered at the offices of the Gas Departm
Hall, on or before Thursday, the 5th day of June
Forms of tender and further particulars may be
on application in writing to Mr. Charles Nick
intendent of the Gas Department.

By order of the Gas Committee,

WM. HENRY TALBOT

Town Hall, 9th May, 1890.

Tow

TAR AND AMMONIA WATER

THE Directors of the Loughb
Gas Company are prepared to receive T
for the surplus TAR and AMMONIA WATER
produced at their Works for One, Two, or Th
from the 30th day of June, 1890.

The estimated quantity will be about 350 ton
and 900 tons of Ammonia water.The Tar and Liquor to be delivered into the
torts' Boats at the Wharf on the Derby Road
borough.The strength of the Liquor to be tested by
Hydrometer (temperature 60°); and tenders to
price per ton to be paid for every 4° of strength fThe Boats for the removal of the Tar and
Water to be sent at such times as may be require
Payments monthly.Further information may be obtained on app
the undersigned, to whom tenders, in accord
this advertisement, must be sent not later than 11
May, 1890.The Directors do not bind themselves to a
highest or any tender.

J. B. BALL, C.E., M

Loughborough, April 30th, 1890.

Miscellaneous.

Replies to Advertisements addressed
"Chemical Trade Journal" office are forw
Advertisers, post free, on the day of their r

TO BE SOLD, the LANCAS
MANURE COMPANY'S WORKS at
with Machinery and 24,420 square yards of Freehol
Address J. Hosking, 16, Fenwick Street, Liverpo

AMMONIUM Nitrate wanted
ton lots; free from Sulphate and Chlori
14 lbs. sample (which will be paid for), in air tight
with lowest price, to J. C. Butterfield, 13, Victo
Westminster, London, S.W.

A YOUNG MAN who has s
Chemistry, theoretically, desires Situation
cal Works. Address, H 130, Chemical Trade
Blackfriars Street, Manchester.

FOR SALE. Twenty-six stron
Casks, tinned inside; capacity, forty gall
fitted with interchangeable screw bungs.—Addre
Chemical Trade Journal, Blackfriars-street, Ma

Miscellaneous.

CHEMIST.—Young Englishman, having concluded a course of Analytical Chemistry in one of the first laboratories of Paris, seeks situation as above; he is quite competent to undertake the management of any laboratory; highest references.—Address "Chemist," 24, Benedict-road, Brixton, London.

TO BE SOLD, A CLIMAX CRUSHER—2 rollers for breaking and 2 rollers for grinding; very efficient and in best condition. A Drying Chamber, 8 ft., 4 ft., by 54 ft.; of wood; with steam coils and 12 shelves on rollers. A Bin, pine, with cover, 2 inch wood; 10 ft., 3 ft. by 3 ft. Some wrought-iron split pulleys, diameter from 4½ ft. to 5½ ft., and width, 2 ft. to 2 ft. 5 in. Also some Countershafts, with fast and loose pulleys, with guide and strapfork. Belts—leather and camel-hair; length 40 to 50 ft., and width, 10 to 14 in. Address, K 132, *Chemical Trade Journal*, Blackfriars St., Manchester.

MANAGER Wanted, to go abroad to erect and work a Wood Distilling Plant.—Write, giving full particulars, to F 134, *Chemical Trade Journal*, Blackfriars-street, Manchester.

ADVERTISER will be open shortly to an engagement as Manager or Chemist; over 20 years' practical experience in Manure, Alkali and Soap Works, and 12 months' thorough practical knowledge of Chance's Sulphur Recovery Process; highest references.—Address K 134, *Chemical Trade Journal*, Blackfriars-street, Manchester.

WANTED, in a Chemical and Physical Warehouse, an Assistant who has experience of the business, especially Chemical and Physical.—Address, giving full particulars, salary expected, &c., "Apparatus," *Chemical Trade Journal*, Blackfriars-street, Manchester.

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IRON TUBES AND FITTINGS for Gas, Water, Steam, Liquid Ammonia, and Hydraulic Work, galvanised white enamelled inside, or coated by Dr. Angus Smith's Composition.

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Oxides,
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Umbers,
Bog Ore,
and all
Minerals

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THE COAL-TAR COLOURS.**

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JAMES DRINKWATER,

Springfield Lane Chemical Works,

SALFORD,

MANCHESTER. [x168]

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Packets
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Export.

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Drying
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They withstand the acid, are well balanced, and move freely on the shaft; little wear and tear.

Once used, always continued.

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W. H. COWBURN,

70, MARKET STREET, MANCHESTER.

AGENT FOR ENGLISH CONSUMERS.

[112H

Tenders.

MANCHESTER CORPORATION GAS WORKS.
TAR AND AMMONIACAL LIQUOR.

THE Gas Committee of the Manchester Corporation are prepared to RECEIVE TENDERS for the PURCHASE and REMOVAL of the TAR and AMMONIACAL LIQUOR to be produced at their Droylsden station during a period of one or more years from the 24th June next.

The Committee do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Tar and Liquor, Droylsden," must be delivered at the offices of the Gas Department, Town Hall, on or before Thursday, the 5th day of June next.

Forms of tender and further particulars may be obtained on application in writing to Mr. Charles Nickson, superintendent of the Gas Department.

By order of the Gas Committee,

WM. HENRY TALBOT,

Town Hall, 9th May, 1890.

Town Clerk.

MANCHESTER CORPORATION GAS WORKS.
SPENT OXIDE.

THE Gas Committee of the Corporation of Manchester are prepared to RECEIVE TENDERS for the PURCHASE and REMOVAL of the SPENT OXIDE to be produced at their Gaythorn, Rochdale-road, and Bradford-road Works during a period of one, two, or three years from the 30th June next.

The Committee do not bind themselves to accept the highest or any tender.

Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Spent Oxide," must be delivered at the offices of the Gas Department, Town Hall, on or before Thursday, the 5th day of June next.

Forms of tender and further particulars may be obtained on application in writing to Mr. Charles Nickson, superintendent of the Gas Department.

By order of the Gas Committee,

WM. HENRY TALBOT,

Town Hall, 9th May, 1890.

Town Clerk.

TAUNTON GAS LIGHT AND COKE COMPANY.
TENDER FOR TAR.

THE Taunton Gas Light and Coke Company are prepared to receive TENDERS for the purchase of the surplus TAR produced at their works over one year, commencing 1st July next.

Tenders, stating price offered per ton, put into Contractor's Tanks at Taunton Railway Station, to be delivered to the undersigned not later than 1st June next.

ALFRED EDWARDS,

May 14th, 1890.

Secretary and Manager.

SURPLUS TAR AND LIQUOR.

THE Gas Committee of the Bingley Improvement Commissioners invite competent firms to TENDER for the purchase of the SURPLUS TAR and LIQUOR as proposed to be made at their Gas Works, Bingley, during the 12 months ending June 30th, 1891.

Form of Tender to be had on application to the undersigned.

Tenders to be addressed to James Gatecliff, Esq., Chairman of the Gas Committee, Commissioners' Offices, Main-street, Bingley, endorsed "Tender for Tar and Liquor," on or before the 9th day of June, 1890.

By Order,

GEORGE DUNBAR MALAM,

May 20th, 1890.

Engineer.

TO MANUFACTURING CHEMISTS & OTHERS.
THE BRIGHOUSE LOCAL

BOARD are prepared to receive TENDERS for the PURCHASE OF THE SURPLUS TAR produced at their Gas Works, for a term of One, Two, or Three Years, from the 1st of July next.

The quantity of Tar made is about 350 tons per annum. The Tar can be loaded into Contractors' carts on the works, or into Barges on the Aire and Calder Canal (which runs alongside) by pipe direct from the works. Any further particulars can be obtained on application to the undersigned.

Sealed Tenders, endorsed on the outside "Tender for Tar," stating price per ton at the Gas Works, must be sent in on or before Thursday, the 5th day of June, 1890, addressed to Richard Kershaw, Esq., Chairman of the Local Board, Public Offices, Brighouse.

The Board do not bind themselves to accept the highest or any Tender.

By order,

JAMES PARKINSON,

Brighouse, May 20th, 1890

Manager.

BOROUGH OF ST. HELENS GAS DEPARTMENT.
TO TAR DISTILLERS.

THE Gas Committee of the St. Helens Corporation invite TENDERS for the purchase of the SURPLUS TAR produced at their Works; estimated quantity about 1100 tons.

Forms of Tender and all particulars may be obtained on application to the undersigned.

The Tenders, properly endorsed, are to be delivered on or before 10th June next, addressed to the Chairman of the Gas Committee, Warrington Old Road, St. Helens.

Gas Works, Warrington Old Road,

May, 1890

Miscellaneous.

TO BE SOLD, the LANCASHIRE MANURE COMPANY'S WORKS at Widnes with Machinery and 24,420 square yards of Freehold Land.—Address J. Hosking, 16, Fenwick Street, Liverpool. (156x)

AMMONIUM Nitrate wanted in 5 ton lots: free from Sulphate and Chloride. Send 14 lbs. sample (which will be paid for), in air tight package with lowest price, to J. C. Butterfield, 13, Victoria-street, Westminster, London, S.W.

A YOUNG MAN who has studied Chemistry, theoretically, desires Situation in Chemical Works. Address, H 130, *Chemical Trade Journal*, Blackfriars Street, Manchester.

MANAGER Wanted, to go abroad to erect and work a Wood Distilling Plant.—Write, giving full particulars, to F 134, *Chemical Trade Journal*, Blackfriars-street, Manchester.

WANTED, in a Chemical and Physical Warehouse, an Assistant who has experience of the business, especially Chemical and Physical.—Address, giving full particulars, salary expected, &c., "Apparatus," *Chemical Trade Journal*, Blackfriars-street, Manchester.

WANTED, by a Young Man, situation as Chemist or Assistant Chemist; has had considerable experience in Wood Distilling, Acetates and Acetic Acid making.—Address S 135, *Chemical Trade Journal*, Blackfriars-street, Manchester.

WANTED, by an F.C.S. and A.I.C., Situation in Chemical Works, with a view to partnership; or would be glad to join analyst in established practice. Reply, stating terms, to Analyst, *Chemical Trade Journal*, Blackfriars Street, Manchester.

TO PHOSPHORIC ACID MAKERS, Wanted, a Foreman having had good experience in the manufacture of this article. Liberal terms to a suitable man. All communications will be treated in strict confidence by "Phosphoric," c/o Deacon's Advertising Offices, Leadenhall Street, London, E.C.

WILLIAM LIVELY SHEPARD, DECEASED. Pursuant to the Act of Parliament 22 and 23 Victoria, Chapter 35, intituled "An Act to further amend the law of property, and to relieve Trustees."

NOTICE IS HEREBY GIVEN, that all creditors and other persons having any claims or demands against the estate of William Lively Shepard, late of 2, Willes-road, Kentish Town, Middlesex, M.R.C.S., deceased (who died on the 17th March, 1890, and whose will was proved in the Principal Registry of the Probate Division of Her Majesty's High Court of Justice, on the 10th day of May, 1890, by Catherine Shepard, and Ernest William Shepard, of 2, Willes-road aforesaid, the Executors therein named) are hereby required to send the particulars in writing of their claims or demands to us, the undersigned, on or before the 8th day of July, 1890, after which date the said Executors will proceed to distribute the assets of the said deceased amongst the persons entitled thereto, having regard only to the claims and demands of which they shall then have had notice, and they will not be liable for the assets of the said deceased or any part thereof so distributed, to any person or persons of whose claims or demands they shall not then have had notice.

Dated this 20th day of May, 1890. COOKE & JONAS, 3, Old Sergeant's Inn, Chancery-lane, London, Solicitors for the Executors.

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Watts' Dictionary of Chemistry and the Allied Sciences. Complete and unabridged edition; 9 vols., cloth, (new), £15., for £8 8s.

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Benedikt and Knecht's Coal-Tar Colours, 5s. 9d.

Gmelin's Hand-Book of Chemistry. By H. WATTS. Complete set, Organic and Inorganic, with Index, 19 vols., 8vo. cloth, scarce, £20, for £7 10s.

Lunge's Coal Tar and Ammonia. New Edition, 27s. Ditto, Previous Edition (S.H.) for 12s.

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H. LEIGH & SONS

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Glasgow Charles-st., St. Rollox

Manchester: Oldham Road,
London: Worship Street, E.

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GAS COMPRESSING ENGINES.  
70,000 I.H.P. ALREADY AT WORK.

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LUMP ALUM,  
POTASH, OR AMMONIA

IS THE FREEST FROM IRON. [206v]

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Near SHEFFIELD.

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[114J]

Telegrams:—"GREGORY, DEEPCAR."

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Filtering, Powdered, &c.  
Lampblack, Founders' Blackings, Plumbago, etc.

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Samples sent free on application to

✻ W. H. COWBURN, ✻  
70, MARKET STREET, MANCHESTER.  
AGENT FOR ENGLISH CONSUMERS. [112H]

**Tenders.**

MANCHESTER CORPORATION GAS  
TAR AND AMMONIACAL LIQUOR  
THE Gas Committee of the  
Manchester Corporation are prepared to  
TENDERS for the PURCHASE and REM  
the TAR and AMMONIACAL LIQUOR to b  
at their Droylsden station during a period of o  
years from the 24th June next.

The Committee do not bind themselves to  
highest or any tender.Sealed tenders, addressed to the Chairman  
Committee, and endorsed "Tender for Tar an  
Droylsden," must be delivered at the offices  
Department, Town Hall, on or before Thursd  
day of June next.Forms of tender and further particulars may b  
on application in writing to Mr. Charles Nick  
intendent of the Gas Department.By order of the Gas Committee,  
WM. HENRY TALBOT

Town Hall, 9th May, 1890. Tow

MANCHESTER CORPORATION GAS  
SPENT OXIDE.

THE Gas Committee of the  
ation of Manchester are prepared to l  
TENDERS for the PURCHASE and REM  
the SPENT OXIDE to be produced at their  
Rochdale-road, and Bradford-road Works duri  
of one, two, or three years from the 30th June n  
The Committee do not bind themselves to  
highest or any tender.

Sealed tenders, addressed to the Chairman  
Committee, and endorsed "Tender for Spent O  
be delivered at the offices of the Gas Depart  
Hall, on or before Thursday, the 5th day of JunForms of tender and further particulars may l  
on application in writing to Mr. Charles Nick  
intendent of the Gas Department.By order of the Gas Committee,  
WM. HENRY TALBOT

Town Hall, 9th May, 1890. Tow

TAUNTON GAS LIGHT AND COKE CO  
TENDER FOR TAR.

THE Taunton Gas Light an  
Company are prepared to receive TENDI  
purchase of the surplus TAR produced at their  
one year, commencing 1st July next.

Tenders, stating price offered per ton, put  
tractor's Tanks at Taunton Railway Station, to b  
to the undersigned not later than 1st June next.ALFRED EDWARDS,  
May 14th, 1890. Secretary and I**SURPLUS TAR AND LIQUOR.**

THE Gas Committee of the l  
Improvement Commissioners invite comp  
to TENDER for the purchase of the SURP  
and LIQUOR as proposed to be made at their C  
Bingley, during the 12 months ending June  
Form of Tender to be had on application to  
signed.

Tenders to be addressed to James Gatecliff, E  
man of the Gas Committee, Commissioners' Off  
street, Bingley, endorsed "Tender for Tar an  
on or before the 9th day of June, 1890.By Order,  
GEORGE DUNBAR M

May 20th, 1890. Engineer.

TO MANUFACTURING CHEMISTS &amp; C

THE BRIGHOUSE LO  
BOARD are prepared to receive TENI  
the PURCHASE OF THE SURPLUS TAR  
at their Gas Works, for a term of One, Two,  
Years, from the 1st of July next.

The quantity of Tar made is about 350 tons  
The Tar can be loaded into Contractors' carts on  
or into Barges on the Aire and Calder Canal (s  
alongside) by pipe direct from the works. A  
particulars can be obtained on application to  
signed.Sealed Tenders, endorsed on the outside "  
Tar," stating price per ton at the Gas Works, m  
in on or before Thursday, the 5th day of J  
addressed to Richard Kershaw, Esq., Chairm  
Local Board, Public Offices, Brighouse.The Board do not bind themselves to accept  
or any Tender.By order,  
JAMES PARKINSON

Brighouse, May 20th, 1890

BOROUGH OF ST. HELENS GAS DEPA  
TO TAR DISTILLERS.

THE Gas Committee of the St.  
Corporation invite TENDERS for the  
the SURPLUS TAR produced at their Works  
quantity about 1100 tons.

Forms of Tender and all particulars may be c  
application to the undersigned.The Tenders, properly endorsed, are to be d  
or before 10th June next, addressed to the C  
the Gas Committee, Warrington Old Road, St.  
Gas Works.S. GLOVER,  
Warrington Old Road, Engineer an  
May, 1890

**Tenders.**

COUNTY BOROUGH OF STOCKPORT.  
(GAS DEPARTMENT.)  
RESIDUAL PRODUCTS FOR SALE.

THE Gas Committee are prepared to receive TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR produced at their Works for a period of One, Two or Three years, commencing on the 1st of July next.

Tenders to state the price per ton for Tar, and price per ton for Liquor 6° Twaddell.

Tenders to be delivered, addressed to the Chairman of the Gas Committee, on or before June 12th, 1890, endorsed "Tender for Tar, &c."

Particulars as to quantity and conditions of contract may be obtained on application to the Engineer.

The Committee do not bind themselves to accept the highest or any tender.

JAMES JACQUES,  
Engineer and Manager.  
Gas Works, May 16, 1890.

COUNTY BOROUGH OF HALIFAX.  
TO MANUFACTURING CHEMISTS AND  
TAR DISTILLERS.

THE Gasworks Committee of the Halifax Corporation are prepared to receive TENDERS for the purchase of the surplus TAR—about 3,500 tons—produced at their Gasworks during the year ending 30th June, 1891. Delivery may take place from the Railway Siding of the Corporation Gasworks, or from the Canal Wharf of the Calder and Hebble Navigation, with which a Tar pipe communicates. Full particulars may be obtained on application to the Engineer, Mr. Thos. Holgate, F.C.S., Gasworks, Halifax. Sealed tenders endorsed "Tar," stating the price offered per ton, and the mode of removal, to be sent to the undersigned not later than 11 a.m., on Friday the 13th June, 1890. The highest or any tender will not necessarily be accepted.

By Order,  
KEIGHLEY WALTON,  
TOWN CLERK.  
Town Hall, Halifax,  
19th May, 1890.

**Miscellaneous.**

TO BE SOLD, the LANCASHIRE MANURE COMPANY'S WORKS at Widnes with Machinery and 24,420 square yards of Freehold Land.—Address J. Hosking, 16, Fenwick Street, Liverpool. [169K]

MANAGER Wanted, to go abroad to erect and work a Wood Distilling Plant.—Write, giving full particulars, to F 134, *Chemical Trade Journal*, Blackfriars-street, Manchester.

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[112H

**Tenders.****SURPLUS TAR AND LIQUOR.****THE** Gas Committee of the Improvement Commissioners invite competition to TENDER for the purchase of the SURP and LIQUOR as proposed to be made at their (Bingley, during the 12 months ending June Form of Tender to be had on application to signed.

Tenders to be addressed to James Gatecliff, Esq. man of the Gas Committee, Commissioners' Office, Bingley, endorsed "Tender for Tar and on or before the 9th day of June, 1890.

By Order,  
**GEORGE DUNBAR M**  
Engineer.

May 20th, 1890.

**COUNTY BOROUGH OF STOCKPORT  
(GAS DEPARTMENT.)****RESIDUAL PRODUCTS FOR SALE****THE** Gas Committee are prepared to receive TENDERS for the purchase of T and AMMONIACAL LIQUOR produced Works for a period of One, Two or Three years, ing on the 1st of July next.

Tenders to state the price per ton for Tar, and for Liquor 6° Twaddell.

Tenders to be delivered, addressed to the Cl the Gas Committee, on or before June 12th, 1890 "Tender for Tar, &amp;c."

Particulars as to quantity and conditions of may be obtained on application to the Engineer.

The Committee do not bind themselves to a highest or any tender.

**JAMES JACQUE**  
Gas Works, May 16, 1890. Engineer and**THE SHREWSBURY GAS LIGHT COM  
DISPOSAL OF SURPLUS TAR.****THE** Directors of the above Co are desirous of receiving TENDERS for the purchase of the surplus TAR made at their works on year commencing July 1st, 1890.

The estimated quantity for disposal is about per annum.

Tenders must be made on Forms (containing particulars) which may be obtained on application to the Company's Works, or by post, and must be sent undesignated not later than the 20th day of June.

The Directors do not bind themselves to a highest or any Tender.

By Order,  
**WM. BELTON, A.M.I.C.**  
Secretary and MGas Works, Shrewsbury,  
29th May, 1890.**Miscellaneous.**

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The property is, as to an area of 1,796 square feet, subject to a low perpetual chief rent, and an area of 5,976 square yards held on a 999 years lease at a low rent. The works can produce about 35 tons of Vitriol per week, and Spirits of Salt, Caustic Soda or Printers' Solutions in proportion, and other Drysaltery Goods.

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Plans and particulars may be had on application to Auctioneers, Albert-square, Manchester, and 35 Victoria-street, London, E.C.; or from Mr. J. BECK, Trustee, on the premises; or from Messrs. C. CHEW &amp; SON, Solicitors, 10, Kennedy-street, Manchester.

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THE SHREWSBURY GAS LIGHT COMPANY.  
DISPOSAL OF SURPLUS TAR.

THE Directors of the above Company are desirous of receiving TENDERS for the purchase of the surplus TAR made at their works during the year commencing July 1st, 1890.

The estimated quantity for disposal is about 200 Tons per annum.

Tenders must be made on Forms (containing further particulars) which may be obtained on application at the Company's Works, or by post, and must be sent in to the undersigned not later than the 30th day of June, 1890.

The Directors do not bind themselves to accept the highest or any Tender.

By Order,  
WM. BELTON, A.M.I.C.E.,  
Secretary and Manager.

Gas Works, Shrewsbury,  
29th May, 1890.

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 [19147]

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**Tenders.****NEW TENDER.****TAR AND AMMONIA LIQUOR**

**THE Penrith Local Board** are prepared to receive TENDERS for the PURCHASE of the SURPLUS TAR and AMMONIACAL LIQUOR produced at their works during the year ending June 30th, 1891.

Full particulars may be obtained on application to Mr. E. Shaul, Gas Manager.

Sealed tenders endorsed "Tender for Tar, &c.," to be delivered to the undersigned not later than Monday, June 30th, 1890.

Public Offices,  
June 12th, 1890.

G. WAINWRIGHT,

Clerk to Local Board,

Penrith.

**COUNTY BOROUGH OF SALFORD,  
GAS DEPARTMENT.  
TAR.**

**THE Gas Committee invite Tenders**

for the purchase and removal of the surplus TAR to be produced at their Bloom-street, Regent-road, and Liverpool-street Works in 12 months from July 13th next.

The approximate quantity will be 4,500 tons. Forms of Tender and Conditions of Contract may be obtained on application to the Gas Engineer, Gas Offices, Bloom-street, Salford.

Sealed Tenders, endorsed "Tender for Tar," addressed to the Chairman of the Gas Committee, must be delivered to me on or before Thursday the 10th July next, at five o'clock in the evening.

By Order.

SAM'L BROWN

Town Clerk.

Town Hall, Salford,  
12th June, 1890.

**Tenders.****CORPORATION OF MOSSLEY****THE Gas Committee of the**

Corporation are prepared to receive Tenders for the purchase of the surplus TAR that may be produced at their Roaches, for 12 months from the 30th June.

Particulars and form of Tender may be obtained from the manager, Mr. R. MERRELL, at the Gas Tenders endorsed "Tender for Tar," to be noon on Monday, July 7th, at the Town Clerk's Office, Mossley.

The Committee do not bind themselves to the highest or any Tender.

JOSEPH HYDE, Town Clerk.

**Miscellaneous.**

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